Professional denture service

George Wood Clapp, Russell Wilford Tench

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PROFESSIONAL DENTURE SERVICE

VOL. II.

BY

GEORGE WOOD CLAPP, D.D.S.

and

RUSSELL WILFORD TENCH, D.D.S.

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TO ALL WHO SEEK WITH HEAD OR
HAND TO PERFECT ANY FORM OF
DENTURE TECHNIC, THIS BOOK IS
RESPECTFULLY DEDICATED

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PREFACE

Since the first volume of Professional Denture Service was written, dentists from nearly every part of the English-speaking world have come to the laboratory of the Research Division of the Dentists' Supply Company to learn by individual instruction the technic which that book describes.

Thousands of other dentists have adopted that technic or some other form of improved technic, at least in part, and are achieving better results than formerly.

The quality of denture instruction in colleges is improving.

The National Association of Denture Prosthetists has been formed for the express purpose of perfecting every detail of denture technic.

Many laboratories are offering greatly improved denture service.

These things mark the dawn of a new day in which denture service will take its place as an equal with operative service in professional attention, esteem, and honor.

All those who by earnest effort and research have contributed to the realization of a scientific denture technic have placed the authors and the entire profession under great obligation. Were it not for the study and research of many men, this volume would have been impossible.

THE AUTHORS

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FOREWORD

When "Professional Denture Service" was written, the Gysi Adaptable Articulator was obtainable. This was the most scientific articulator known, and for this reason, the technic of the book was built around it. A condition resulting from the world war shut off the supply of Adaptable Articulators. The Gysi Simplex is now the only available articulator, embodying the necessary scientific principles.

The purpose of this volume is to present in readily accessible and usable form the technical steps necessary to the construction of the highest type of full upper and lower dentures in conjunction with the use of the Gysi Simplex Articulator. Most of these steps are described in detail and fully illustrated in the first volume of Professional Denture Service.

During the years since the first volume was issued, the technic has been continuously and extensively studied. There has been no reason to change any of the principles set forth in that volume. Certain changes in procedure have been developed within our Research Laboratory, and others have been adopted from suggestions made by members of the classes taught by the laboratory force. These changes render attainable results heretofore impossible and reduce the chances of error. They are described in detail in this volume and some are illustrated.

The full compound technic for impressions is retained. Skilful and conscientious practitioners are using a combination of plaster with a compound tray with apparent satisfaction. While such a technic may give satisfactory results in Class I and perhaps in Class II mouths, we believe that it can be used satisfactorily in Class III and Class IV mouths, only when the dentist is one possessing

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exceptional skill. On the other hand, the full compound technic, when mastered, is quite as satisfactory as any other in Class I and Class II mouths, and with it the dentist of ordinary ability can attain results in Class III and Class IV mouths which would be otherwise impossible.

Judged by the old, unscientific technic, the denture technic presented herein will appear formidable. It should not be so judged. It should be judged by its results which are entirely unlike the results of unscientific technic. When properly applied, this technic produces, *in all classes of mouths,* dentures which are stable in all positions of the mouth, efficient in speech and mastication, comfortable in use, and natural in appearance. In about 90% of all cases, the lower dentures have good "suction." The achievement of "suction" in lowers is too recent to permit us to say how long it endures, but it still exists in cases which we have had under observation for four years, and it is our opinion that where pathological conditions do not interfere, suction is nearly, if not quite, as permanent in the lower as in the upper when dentures are articulated to harmonize with the patient's habitual masticatory movements.

The difficulties in connection with the mastery of this technic lie in the dentist rather than in the technic. They arise from the fact that dentists were not taught, early in their professional careers, to manipulate modeling compound properly and to take correct impressions and bites. They arise from the fact that dentists fail to realize the necessity for accuracy in denture construction to a sufficient degree to make them willing to bear the necessary sacrifice of time and effort required to master accurate technic. As soon as the dentist has taught himself to do these things, the difficulties will largely disappear.

This technic offers no inducement for the dentist who wishes something with which "to get by." It does offer an inducement to the dentist who wishes to develop his skill to the point where he will be able to render the

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highest type of service to his denture patients. It seeks to set the standard of denture service on the very front line of professional achievement.

In closing, permit us one word which is fully justified by experience. That dentist is unfair to his patient, to his profession, and to himself who seeks to sell a quality of service which he knows he does not possess. This technic is not an excuse for glib talk, insincere salesmanship, or the collection of unearned fees. It is the means for the expression of a high degree of professional skill and the discharge in a satisfactory manner of an important professional obligation. Its mastery requires a lot of close application to develop abilities which are now dormant in most dentists. Readily understood, it is worthy to take its place beside any other form of dental technic. It is too fine to be thoughtlessly or carelessly used or to be followed for mere financial gain.

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Mental Attitude of Patients Toward Artificial Dentures.

The patient's conception of what he is to receive will probably be established at the first consultation.

At this time, the dentist should be very careful not to arouse expectations which can not be fulfilled.

This is the proper time to agree upon the fee for the service and the terms of its payment.

In the days before the development of scientific denture technic, few dentists were inclined to recommend artificial dentures to any patient for whom another form of service could be made even partly satisfactory. The frequency of failures in denture service led most dentists to preserve natural teeth and to postpone as long as possible the evil day of the making of artificial dentures.

The increased knowledge of the dangers to the patient's health from the retention of diseased teeth and the undesirability of such teeth as bridge abutments have necessitated the extraction of a greatly increased number of teeth, and extraction will probably be much more frequent in the future than it has been in the past.

With the development of scientific denture technic, the dread of failure in denture making is removed and dentists are able to recommend artificial dentures with a certain degree of confidence. It is probably unavoidable, but it is certainly unfortunate, that there should be some dentists with whom the mastery of the denture making technic is more verbal than digital; that is, they practice much better with words than with their fingers. They arouse in patients' minds expectations which no one can fulfill, and from that time on, success with that patient is either difficult or impossible.

One of the most frequent causes for failure in denture service is the creation in the patient's mind of expectations which can not be met. Whatever may be the den-

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tist's success with dentures and however great may be his convictions as to the quality of service he can render to the patient, he will be wise if he is very conservative in making promises. His position will be much better if his achievement exceeds the patient's expectations than it will be if the pleasurable anticipations which he has aroused are only partly fulfilled.

Dentists' conservatism in expression should be especially marked in case of patients who have never worn artificial dentures. Such patients have only memories of natural dentures by which to judge the artificial, and they remember the natural dentures when at their best. We have found it to be wise to go to the extreme of conservatism in such cases by making opportunity for some such expression as:

"Of course the best artificial dentures are in no way equal to a good natural dentition. They are but substitutes and a substitute is rarely as satisfactory as the original.

"Artificial dentures should be judged by the improvement they effect in your appearance, masticating efficiency and speech above what is possible in these things without them. They should not be expected to excel or approach the beauty and efficiency of nature.

"When one comes face to face with the fact that the natural teeth can not safely be retained longer, artificial dentures are the only choice left and the more accurately these are made, the more chance there is that one may easily become accustomed to them and learn to masticate satisfactorily with them. When conditions are most favorable, artificial dentures are so different from natural teeth that we often wonder how it is that so many people find it possible to learn to wear them and to get along with them quite as well as many people do with natural teeth."

Sometimes expressions of this tone cause a person to decide not to have the dentures made and the dentist loses a case. In such instances, this is the best thing that

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could occur to him, because it occurs only when the patient seeks dentures with an exaggerated conception of what the dentures can perform, and while that conception remains, the dentist will find it impossible to satisfy the patient and will very likely regret the day on which he undertook the work. Only recently, a dentist brought a patient to the laboratory for whom he had exhibited a high degree of skill. He had done all that could be done in that case, but the patient was not satisfied because he had aroused in her mind expectations which were impossible of fulfillment.

A very successful prosthetist attributes no small part of his success in denture practice to the fact that he learns just what the patient's expectations and requirements are, and that before undertaking any case, he imparts to the patient, plainly and firmly, his own conceptions of what is possible in the case and what will be necessary in order to enable him to effect that achievement. In what he calls "treatment cases," work upon the mouth may be necessary for one or two years, and he refuses to accept the case and begin work until the patient understands and assents to this condition.

When the patient has worn unscientific artificial dentures, the dentist may be slightly less conservative in his expressions, but conservatism is both becoming and valuable. We have been for some years in contact with a group of physicians and surgeons who are doing some really wonderful work. We are impressed not less by their conservatism in expression than by their skill. They explain that conservatism upon the ground that their knowledge is only partial and incomplete, that some unforeseen circumstances may make it impossible to achieve success, and that patients are more fairly treated by statements which express less than they expect to achieve than by the generation of hopes which they may not be able to fulfill. This attitude which is so becoming in them is equally becoming in us as dentists.

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The Cost of Denture Service.

It is proper and wise for any dentist, who considers replacing unscientific denture technic by the technic described in the following pages, to consider whether or not unscientific denture work has been profitable, and what changes in fee, if any, would be necessary to make the scientific technic profitable.

The cost of any form of denture service may be divided into two parts, described as "seen" and "unseen."

The "seen costs" are easily computed. They consist of the cost of materials used and the time of all persons engaged upon the work, until the patient is discharged as satisfied, or the case is given up as hopeless. The seen cost will vary according to the income hour cost of conducting the office, the quality of materials used, the time expended in constructing the case, the time spent in fitting the case to the mouth or in satisfying the patient, and the percentage of plates which patients will not accept and which have to be remade.

In some cases the seen cost may be very low. In one case a dentist well skilled in a thoroughly unscientific technic, took full upper and lower plaster impressions, a mash bite, poured two plaster models, attached them to a plain line articulator, made wax bases, and set the upper and lower teeth ready for a "try in" in sixty minutes. It was said to be the custom in this office to inform patients, who could not be satisfied with plates made in this way, that they had unusual mouths and that the plate would have to be remade at a higher fee.

Records collected from 150 dentists, show that single unscientific dentures require an average of four visits by the patient after the plate is placed in the mouth, for greater or smaller adjustment, requiring on the average, eighty minutes; and after all adjustments and persuasion,

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one plate in every four had to be remade, often without remuneration. Experience has shown that when the dentist has mastered a scientific technic, the subsequent visits for adjustments are few and short, and that even the most exacting dentists do not make over more than one plate in twenty-five.

The term "unseen cost" is used to cover those items of cost which are not shown by the usual methods of dental office accounting. Such costs include the time lost in trying to satisfy a patient by persuasion or alteration, the time lost in remaking plates which the patient cannot be persuaded to accept, the loss of reputation which unscientific denture service insures, and the loss of confidence by the dentist when he finds himself manifestly unable to render satisfactory denture service. These costs may be much more important than the "seen costs," and it was very probably a partial realization of these costs which, years ago, led many dentists to abandon plate work.

It is easy to understand why the failure of one or two dentures may be very expensive to the dentist while a success is only moderately profitable. If the dentures are notably successful, the patient is pleased at first, and may mention it to friends, but familiarity in this case breeds forgetfulness, the dentures are soon accepted as a matter of course, and only rarely is praise thought of in connection with them. If the dentures are not satisfactory, the patient's sense of disappointment is renewed at every failure to function, and complaints may be frequent, and addressed to many persons.

The seen costs of scientific denture work are greater than the seen costs of unscientific work, because it takes more time at both chair and bench to follow out the exact technic. The unseen costs are much less in scientific denture work than in unscientific denture work. Success which is continuously pleasing to both the patient and the dentist is achieved in a gratifying percentage of cases, and in the remainder of cases the results are

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far better than would have been satisfactory by an unscientific technic, save by rare chance. With an unscientific denture technic the unseen costs are all liabilities, frequently injurious to the dentist's reputation. For this reason a well known teacher tells his students that unscientific dentures are an expense to the practice and not an asset. Scientific denture technic turns at least the vast majority of the unseen costs into assets, and reputation builders for the profession.

The question as to what dentures cost could much more easily be answered if exact times for procedure could be given, but this is at present impossible. The time required for any case will depend in some degree upon the difficulties of the case, but in much greater degree upon the aptitude of the dentist and the standard of excellence in work to which he holds himself. Some of the finest workmen in the country average from two hours to two and a half hours for full upper and lower impressions and bites, and about twenty to thirty-five hours of actual working time, both at the chair and in the laboratory, from the beginning of the impression to the dismissal of the patient with full upper and lower dentures. Other dentists, certainly of no greater ability, but with less exacting standards, complete full upper and lower cases in eleven hours.

Between these extremes each man may find his own place, with due regard to the conditions within himself and in his community. In seeking that place, it may be worth while to remember that some of the finest dental practices in the United States are today held by men who follow the most exacting technic with the minutest attention to detail.

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The Fee and the Terms of Payment.

The dentist should know what fee is satisfactory for him for the quality of service he proposes to render. Discussion of the fee and the terms upon which it can be paid may be deferred until after snap impressions and study casts are made but should be agreed upon, and noted on a chart in the patient's presence, before the actual impressions are taken.

When the patient comes seeking service, he is, on the average, in a more receptive attitude of mind toward the payment than he is likely to be at any later time.

The statement of the fee in advance gives the patient a chance to decline the service, if the attitude of mind or the financial condition makes it advisable.

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How to Use This Book.

In this book the technic has been divided into a series of consecutive numbered divisions called steps. The steps are numbered to permit easy reference. The heading at the beginning of each step is intended to be sufficiently descriptive of the text to indicate the operation described in the steps when the dentist has gone over the technic a time or two.

To conserve time, certain phrases repeatedly used in "Professional Denture Service" to describe technic procedure have been condensed either into short phrases or into words descriptive of the technic to which they apply. Definitions of the words and phrases employed will be found arranged in alphabetical order in the appendix. These should be studied and memorized.

Wherever necessary to render the technic understandable, a brief description of the step or of the purpose or object of the step is given immediately after the heading. These explanatory paragraphs are separated from the description of the technic by the word "Procedure." Under the word "Note" special instructions or cautions are given. References to the first volume of "Professional Denture Service," to definitions, and to preceding steps are made, where necessary, by marginal notations, opposite the line which requires the reference. It is believed that the text will be easier to read and understand as a result of this plan.

References to "Professional Denture Service" are mostly made through the illustrations, as a glance at the illustrations will usually render the meaning of the text clear. It is advised that the text under the illustrations referred to in "Professional Denture Service" be studied carefully at least the first time or two that this book is read. It is suggested that on reading either volume of

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"Professional Denture Service" lines containing points of special interest to the reader be underlined for future study and reference. The text of "Professional Denture Service" has been so condensed and boiled down that it must be read carefully if the meaning is to be clear.

An outline of the characters employed in marginal references, and the uses of these characters follow:

f. Refers to a figure or illustration in the first volume of "Professional Denture Service," f-1 refers to Figure 1 of that book.

d. Refers to a definition or description in the appendix and occurs opposite the line in which the unusual word or phrase requiring definition appears.

p. Refers to a page of the first volume of "Professional Denture Service," p-1 refers to Page 1 of the first volume of "Professional Denture Service."

s. Refers to a step or division of this volume of "Professional Denture Service," s-7 refers to step No. 7 of the text of this book.

10 mm. ▬▬▬. The black lines following millimeter specifications are of the length the number used specifies. It is hoped this will assist the eye in gauging dimensions.

When the technic of the first volume and the second volume differs, it is intended that the technic of the second volume be adhered to. This refers especially to the technic for the trimming of the lower impression. In setting up teeth, either the technic described in the first volume using the occlusal plane square or that described in the second volume may be employed.

Each time that an impression is to be taken or a set of teeth articulated, the steps dealing with these subjects should be carefully reviewed a short time before the work is done. Before starting to operate, lay the book in a convenient place, so that the headings may be read and used to guide the way through the operation. It should soon be possible to go through the technic without reference to anything but the step headings.

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Surgical Preparation of the Mouth.

After examination of the mouth, it may seem advisable to surgically remove part of the anterior plate of the upper or lower ridge or a prominent body tuberosity, in order to gain room to arrange the teeth, to improve the appearance, or to render the denture more stable. Soft, flabby, or pendulous ridges may usually be removed with beneficial results.

It is not the province of this book to deal with oral surgery, but we feel that it is wise to sound a note of warning concerning the extensive, unnecessary destruction of alveolar tissue and the misplacing of peripheral areolar tissue which often occurs in the so-called "surgical removal of teeth." Under the most favorable circumstances, the alveolar ridges often resorb very rapidly. This soon brings the patient's mouth to such a condition that the construction of dentures becomes very difficult, with a corresponding decrease in the efficiency that may be expected. The oral surgeon should take this into consideration and avoid extensive removal of healthy tissue not demanded, either by esthetics or by a lack of space between ridges, etc.

Suturing, after removal of process if indicated at all, should be so done that the muco-periosteum on the buccal and labial borders of the ridges may not be pulled toward the crest of the ridge out of the position normal to it. The prosthetist should be consulted by the surgeon before operations of this kind are performed. To assist and guide the oral surgeon, study casts should be made and mounted in an articulator. Marks should be made on the casts to indicate the areas of tissue to be removed. Sections of the casts may be cut away and trimmed where feasible, to indicate the depth to which excess tissue is to be removed.

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1. Thoroughly Examine the Oral Cavity.

To determine the tone of the mucosa. When the mouth is inflamed, the dentures should not be worn except at meals until inflammation has subsided. It is an excellent plan to insist that the dentures be not worn for 24 hours before the impression is taken.

To determine the location of soft or hard tissue formations that may require surgical removal.

d. p-16. To determine the proper classification of tissue conditions to assist in choosing a suitable procedure for impression making.

To determine the outline of the base of the proposed dentures, as indicated by the location of muscle attachments.

To determine the amount of clearance between the rami and the upper tuberosities during lateral and opening movements of the mandible, and the effect of this clearance in limiting the size and thickness of the flanges in this region.

2. Make Upper and Lower Snap Impressions.

Take the impressions with any trays suited to the size and form of the mouth. The margins of the snap impressions should be extended as far as the muscle attachments will allow. When the impressions are set, remove them and place in ice-water to chill.

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3. Trim Surplus from Snap Impressions.

Procedure: Make a short indelible pencil mark
f-3. across the median zone of the upper vault, about where the upper denture should end. Make a second mark across the vault, 6 mm. ▬ distal from
f-63. the first one, and transfer these marks to the upper impression by placing the dried impression in the mouth for a few seconds while the marks are moist. Trim the distal edge of the upper snap impression until it is even with the distal transfer mark. Shorten the lingual flange of the lower impression if
f-56. it extends below the level of the mylohyoid ridge.

4. Make Upper and Lower Study Casts.

Note: Steps 4 to 9, 16, and 17 may be performed in the laboratory, if desired, the remainder of the impression technic being deferred to a second sitting.

The casts may be made of compound or of plaster, the former when the entire technic is performed at the chair.

Procedure for compound: Chill the impression in ice-water. Take a quantity of soft compound from the heater, chill, and manipulate until it is of a
d. stiff "moulding consistency," and then quickly force it into the impression. The impression and compound forced into it are placed in ice-water until chilled, and then separated. If a good cast does not result from the first attempt, warm the surface of the cast in the hot water, and force the cast into the chilled impression. The base of the cast may be given a flat surface by pressing it against a moist glass while the compound is soft.

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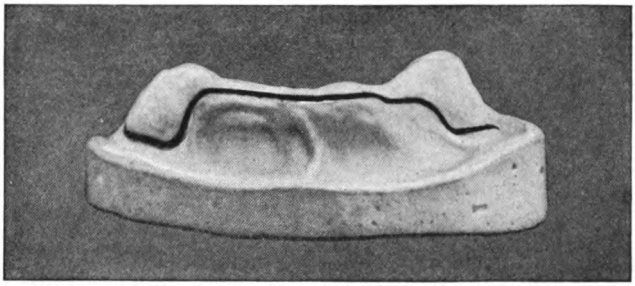

Fig. 1. Upper study cast with outline for upper tray indicated upon it.

5. Select, Trim and Shape the Upper Tray.

The upper tray should be long enough to reach to the distal of the palate of the study cast.

Procedure: Cut away the labial flange of the tray
f-4-B. as far back as the first bicuspid zones. Bend or burnish the palatal portion and then the flanges of the tray successively into approximate adaptation to the cast. The buccal flanges of the tray should be long enough to just touch the outline made on the cast by the inner edge of the snap impression flanges. If the sides of the ridges are almost perpendicular, bend the tray flanges to stand away from the cast 1.5 mm. ■ ; (if the sides of the ridges slope upward and outward from the perpendicular, it will not be necessary).

When undercuts exist in the region of the upper tuberosities, the tray should be so shaped that, when it is seated in the mouth, a space of at least 2 mm. ■ will intervene between the flange of the tray and the tuberosity, as the flange passes the tuberosity.

Note: To determine accurately the relation of the tray to the posterior third of the mouth, use the

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f-6. f-8 adjustment blocks. If the mouth presents a contour similar to that of the tray as it is purchased, the tray may be fitted direct to the mouth without making a cast.

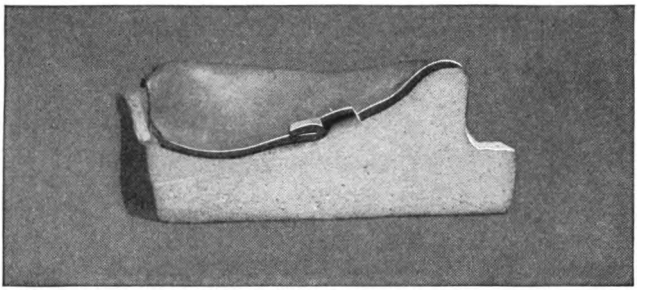

Fig. 2. Cross section of study cast and tray with view of preparation of hole for stop rivet.

6. Attach a "Stop Rivet" to the Tray.

Procedure: Burnish two thicknesses of number 60 tinfoil or one thickness of 30 gauge tin into contact with the central palatal portion of the compound upper cast. This need not be done for the plaster cast.

With a sharp knife, punch out a rectangular flap of tray material, slightly in front of the center of the tray, by making three connecting cuts about 5 mm. ▬ long, at right angles to each other. Bend the flap down and then up against the lingual side of tray. Soften a small piece of "Trubase" in the Bunsen flame to a moulding consistency, and form it into a cone. Hold the tray palate side up and force the point of the cone downward through the hole. Flatten and expand the material, which was forced through the hole, against the lingual side of the tray. Warm the material on the palatal side of the tray. Lay the upper cast on the bench, palate

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upward. Invert the tray and press it toward the cast, compressing the softened Trubase until the tray stands away from the cast about 2 mm. ■ across the heel and the same, or a little more, in front. Effect this adaptation by pressure of the finger on the hard lingual end of the cone of softened composition. This operation must be done quickly to avoid softening the compound cast.

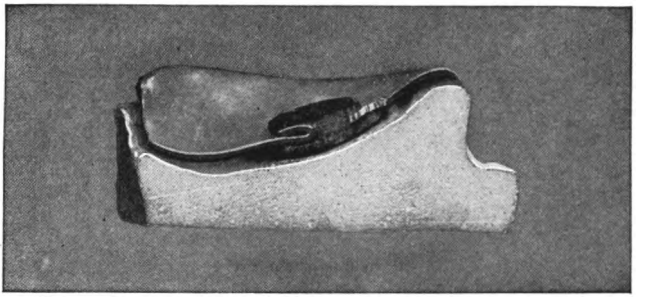

Fig. 3. Same as Fig. 2, showing "stop rivet" in place and relation of tray to cast.

d. The cone of baseplate composition forms a "stop" which acts, as its name implies, to stop the upward motion of the tray and prevents it from being forced through the compound into contact with the ridge f-9-B. during impression making. It assists in securing comfortable and accurate adaptation of the compound to the mouth, by relieving pressure on the compound as soon as the tray is in position.

If the stop is not used, there is danger that the pressure, used in holding the tray in position, will cause the compound to change its form after it has become too hard to properly accommodate itself to the position of soft tissue, and that it may displace this soft tissue horizontally, and over-compress the vascular areas. The stop prevents the ill effects of continuous pressure on the setting compound.

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7. Build a Bite Rim on the Upper Tray.

f-10. Procedure: Smear most of the palatal surface, and
that portion of the lingual surface of the upper
f-11. tray to be included in the bite rim zone, with a thin
coat of sputtering hot compound, from the end of
a tracing stick. Form a roll of soft compound
about 8 mm. in diameter. Allow it to harden
d. until it is just at moulding consistency. Heat the
side of one-third of the roll in the flame until it
f-24. sputters, and press it against the bite rim zone of
f-25. one side of the tray. When by two successive heat-
ings the remainder of the roll is attached to the
tray, press the softened occlusal surface of the rim
against a moistened glass, and flatten it to approxi-
d. mate the inclinations for the "plane of occlusion."
Make the rim as short as possible vertically. Let the
f-26. rim end at about the position of the distal cusps of
the first molar. The rim affords a means of holding
the tray when inserting it into the mouth in im-
pression taking. It also helps to locate the tray
properly.

A Trubyte Rim Former will be found useful in forming bite rims.

Procedure: Draw the parts of the bite rim former apart horizontally. Place a suitable quantity of soft compound within the concave part. Press the parts together horizontally and hold one side of the bite rim former against a moist glass slab. Then pack the compound into the bite rim groove with the fingers of the free hand. Before the compound is hard, trim off surplus compound with a knife, remove the rim from the bite rim former, and bend it to the arch curvature shown by the tray. Lay the rim on the glass slab, heat the upper surface of it, then press the tray into the heated compound.

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8. Draw a Line on the Face to Show the Inclination for the Plane of Occlusion.

Procedure: A cylindrical metal instrument with a blunted tapering end, such as the end of a Slip
f-192. Joint Stem, may be introduced into the orifice of the auditory canal and carefully supported by upward-forward pressure, with its long axis at right angles to the sagittal plane. The upper side of the instrument is to be in contact with the upper surface of the canal. Dampen the point of a Century Negative Pencil, and carefully scribe a short line on the face just in front of the tragus of the ear and level with the top of the projecting part of the cylindrical instrument. Make a second short mark on the face at the place where the wing of the nose joins the cheek. Place a Twentieth Century Millimeter Rule
f-30. against the face so that its lower edge is in line with the mark in front of the tragus and the one at the nose. Support the rule in this position without moving the skin of the face, and with the left hand draw a straight line that will connect the two marks. This line indicates the antero-posterior inclination for the plane of occlusion.

f-29. The right to left inclination of the plane of occlusion is gauged from an imaginary line connecting the centers of the pupils of the eyes.

9. Determine Size of the "Impression Mass."

Take a quantity of compound from the heater, partly chill it, and flatten it into a sheet about 4 mm. ▬ thick. Mould the sheet of compound to fit loosely over the upper study cast. Clip away the portion of the compound that extends beyond the outline of the impression. The blank left contains enough compound for the upper impression.

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10. Place the Compound on the Tray and Prepare It for Taking the Impression.

Procedure: Take the blank just formed and soften it to a moulding consistency by dipping into hot
f-13. water, form it into a cone, heat the tip of the cone and press it against the tray. Mould the compound in the tray so that there is a mound in the
f-14. center of the tray that will touch the vault first, and so that the flanges will touch the sides of the ridge next. (The entire mass of compound covering the palate of the tray should be soft, to the surface of the metal, to avoid tissue strain and a temporary fit that may result from taking the impression with compound at a consistency too near the setting point. The labial and buccal surfaces of the
f-17. flanges may be somewhat hard to assist in retaining the shape of the flanges while introducing the tray into the mouth.) The portion of compound intended to touch the ridge should not be more than 3 mm. ▬ thick at any point. Dip the rearmost 5
f-16. mm. ▬ of the tray into hot water for about five
d. seconds; remove from the water, "glaze," and "temper."

11. Make the Upper Base Impression.

Object: To secure a clean, accurate imprint of the palate and lower third of the bucco-labial aspect of the ridge. To seat the tray so that the total thickness of tray and compound, between the tuberosity of the upper and the adjacent portion of the ramus, will be less than 3 mm. ▬ and so that the stop rivet will come into contact with the median tissue of the palate. To approximately adapt the flanges to the outer surface of the ridges and to carry the compound of the flanges higher than indicated for the finished impression.

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f-19. Procedure: Introduce the impression mass into
f-20. the mouth and force the tray upward and slightly
f-21. forward until it is almost seated, with pressure applied to both right and left sides in the bicuspid region. Apply the seating pressure slightly nearer the rear of the tray than the front. Settle the tray toward the ridge with a lateral rocking motion. After the tray has been partly seated, transfer the fingers so that the pressure will be applied by the index finger of the right hand near the stop rivet in the center of the tray. Continue the pressure until the stop prevents further movement.

Hold the tray in place and apply moderate pressure upon the stop rivet with one hand, while forcing the compound of the flanges up between the lip, or the cheek, and ridge with the other. In adapting the compound to the ridge, apply the pressure progressively, from the bottom toward the top, starting near the base of the flange and rolling the finger in a manner that will gradually raise the level of the pressure to the top of the flange. This will avoid creases inside the impression, which usually occur when pressure is applied from the top down. Light pressure may be made upon the cheek in an inward and upward direction to assist in conforming the flanges to the outside of the
d. ridge. "Chill" and "remove."

The manipulation for the flanges should be so done that no movement is transmitted to the impression tray, and it is best effected when the compound is at a stiff moulding consistency. It is better to omit the conformation of the flanges than to take a chance on distorting the base impression. The flanges may also be built up by tracing if desired.

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12. Trim Surplus from Upper Base Impression.

f-22. Leave the flanges of an even thickness of 3 mm. ▬ to prevent distortion, and to aid in muscle trimming. Determine the correct antero-posterior length for the impression, by means of an indelible pencil
f-23. mark made on the vault where the denture is to end, and transferred to the impression. Trim the heels of the impression to this mark.

The upper denture should end distally just at a line where muscular action modifies the shape of the soft palate, in speech or in swallowing action.

13. Build Up Defective Margins, If Indicated.

When the base impression is not firmly retained, this may indicate either that the margins are not extended sufficiently, or that the adaptation of the impression flanges is poor. The margins of the flanges do not extend high enough if the ridge can be seen or felt to be exposed above any part of the impression flange when the impression is seated. When the flanges are of a correct height, they will fit snugly against the fleshy cushion at the upper boundary of the ridge. At this stage in the technic, over extension of the flanges is permissible.

Add compound from a softened tracing stick to the top of the impression flange, where it is "under ex-
d. tended." Temper, and seat the impression in the mouth, and adapt the soft compound to the underlying tissue, with light pressure of the finger tip. Chill impression and remove. Proceed in like manner until all marginal errors are corrected.

When a space can be seen between the impression and the ridge, the adaptation is poor. A further

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indication of poor adaptation is the formation of small bubbles at any part of the periphery of the impression, when the impression is seated. Bubbles form where the adaptation is poor. Adaptation of a flange may be perfected at this stage, by heat-
d. ing the defective area to the bending stage in hot water. The impression is seated by pressure on the stop in an upward forward direction, and the softened areas are adapted to the ridge with light
d. finger pressure. "Chill the impression in the
d. mouth" and "remove." If the adaptation of the rear of the impression is poor, post dam with com-
d. pound, using tracing stick mouth blowpipe technic.

14. Trim Upper Bite Rim to the Occlusal Plane.

The upper bite rim should be as short vertically as
f-29. a proper lateral and antero-posterior inclination
f-30. for the plane of occlusion will permit. A short upper bite rim leaves more space for taking the lower impression. The rim may be made vertically longer, later, if esthetics requires, and may be lengthened later without altering the inclination of the occlusal plane.

Procedure: The lateral inclination for the occlusal plane, at the incisor region of the bite rim, is established by trimming the rim until an occlusal
d. plane straight edge, held against this section, paral-
f-29. lels an imaginary line connecting the pupils of the eyes.

The antero-posterior inclination for the occlusal plane is established by altering the molar bicuspid section of the bite rim until an occlusal plane straight edge held against the occlusal of the bite rim in the bicuspid molar region, will parallel the
f-30, s-8. guide line on the side of the face.

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15. Cut Guide Notches in Upper Bite Rim.

f-33. Procedure: Cut V-shaped notches in the occlusal surface of the bite rim so that a notch will be above each lower second bicuspid region of the lower ridge. The notches should be about 7 mm. wide at the buccal side, tapering to 5 mm. at the lingual, and about 3 mm. to 4 mm. deep. The completion of the upper impression is now deferred
d. until the lower "bite support" is made.

16. Shape the Lower Tray.

f-34. Procedure: Select a lower tray long enough to reach to the heels of the cast. Cut away the labial and lingual flanges of the incisor section of the tray, so that the labial surface of the incisor ridge will be left uncovered, and so that the lingual flange may not touch the frenum. Form the tray so that
f-35. it is nearly flat from side to side, and bend it to conform with the antero-posterior curves of the ridge.

If the heel of the lower cast terminates more than 8 mm. above the plane of the molar bicuspid region of the lower ridge, shorten the lower tray to end where this plane would intersect the tray when in position on the ridge. The ends of the lower tray should not project above the occlusal plane.

17. Guide Rim the Lower Tray.

Procedure: Smear the distal 2 cm. of the edges of the buccal and lingual flanges of the tray with
f-10. fluid compound from the heated tracing stick, and attach a small piece of soft compound to each heel. When the compound has hardened to a stiff moulding consistency, seat the tray on the cast, squarely over the ridge, and carry it to within 2 mm.

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of touching the ridge of the cast, all around. Remove the tray at once and chill the compound. A mass of soft compound is now built up in the incisor region. This is allowed to harden to the moulding stage, when the tray is seated on the cast by pressure at the heels. Remove the tray and chill the compound

f-36-f-37. Note: The guide rims may be fitted in the mouth
f-38. when the ridge is soft.

18. Make the Lower Bite Support.

Smear the upper surface of the lower tray with a thin coat of hot tracing stick compound. Place the chilled upper base impression in the mouth.

s-7. Procedure: Take a roll of compound 1 cm. in
d. diameter and of moulding consistency, and attach it to the tray. Mould two wedge-shaped mounds on the upper surface of the lower rim where this rim is expected to come into contact with the notches
f-42. in the upper rim. Seat and hold the lower tray
f-43. firmly in position on the ridge. Instruct the patient to place the tip of the tongue in contact with the rear edge of the upper impression, and close. Allow the patient to close until the distance between the incisor zone of the lower ridge and the occlusal surface of the upper rim is about 4 mm. unless the relation of the upper tuberosities to the mandible prevents. Trim the bite rim so that it
f-44. will terminate on each side at about the location of the distal sides of the first lower molars. We
d. now have what will be called the "bite support." If the heels of the lower tray touch the upper tray when the bite rims are in contact, shorten the heels of the lower, enough to allow a clearance of a

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full 3 mm. ▬ between them and the upper tray in this relation. Trim surplus from the inner and outer margins of the bite rim plane.

19. "Suction Trim" the Flanges of the Upper.

d. The "suction trimming" of the flanges of the upper impression is done in three operations. The two buccal sections are trimmed first and the labial last. (The patient should be taught how to "ex-
d. haust the air" from the mouth with the cold upper impression and bite support in place, before attempting to take the impression.)

d. Note: See impression technic under "Classification" for Class IV soft ridge cases.

Procedure: Place the bite support in the mouth. Fold a cotton gauze napkin, six inches (about 15 cm.) square, on itself twice, so that it will be three-ply thick and one-third as wide as it is long, and saturate it with ice-water. Lay the folded gauze upon the palate of the upper impression so that one end of it covers the palate and the other end folds around the posterior margin of the palate and rests against the under side, or lingual surface, of the impression. A yellow tipped flame from the mouth blowpipe may now be directed against the inner surface of the upper, or marginal, third of the section of the impression flange to be trimmed, until it is glazed and softened through to the moulding consistency, without danger of marring the palate portion of the impression. Heat one section for trimming, remove the gauze, temper the
d. heated surface only, and seat the impression in the mouth. Direct the patient to close, and to hold the bite support in contact with the upper impres-
d. sion and to withdraw, or "exhaust," the air from

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the mouth. The bite rims must remain in contact, while the impression is being trimmed and chilled.

d. Remove the impression and employ the same technic for the buccal flange of the other side, and finally also for the labial flange.

20. "Muscle Trim" the Upper Buccal Flanges.

The sections of the margins of the buccal flanges, that are situated above the bicuspid zone of the impression, must be trimmed to accommodate the movement of tissue, generated in muscle movements causing extreme protrusion of the lips or extreme retrusion of the angles of the mouth. Trimming may be effected for both sides at the same time, or each side may be trimmed independent of the other. Place the bite support in position on the lower ridge.

Procedure: With the mouth blowpipe flame, heat the margin of the flange, situated just above the

d. bicuspid zone, to a depth of about 2 mm. ■ Temper the heated area, and place the impression in the mouth. Have the patient close, so that the bite support is held firmly in contact with the upper

f-60. bite rim, and protrude and retract the lips forcibly

f-61. several times. "Chill the impression in position,"

f-65. and remove from the mouth.

21. Inspect the Flanges for Errors.

Procedure: Deflect the lip only enough to permit the top of the impression flange to be inspected and if it does not extend high enough to cover all of the labial or buccal surfaces of the ridge, make

d. a "tracing stick addition" to the flange where it shows deficiency. Place the impression in the mouth and mould the addition to shape, with light

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d. downward pressure of the finger on the lip. Inspect the flanges to determine that they are not "over-extended." Unseat the impression and deflect the lip or cheek sufficiently to permit a view of the margin of the impression. Seat the impression slowly, and if in so doing the margin touches the muscle tissue and displaces it upward, this may be taken to indicate that the flange is over-extended, and that trimming is required, either by carefully cutting with a knife, or by heating and muscle trimming. The margins of the impression flange should come into contact with the tissue opposite the zone of muscle attachment, at the same time that the impression seats on the ridge.

See that the labial impression flange is in contact with the ridge when forward and upward pressure is made on the stop-rivet.

22. Transfer, to the Impression, Outlines of Areas to be Relieved and Compressed.

f-62. Outlines should be made around the hard tissue in the median area of the palate, also over the palatine foramina, and a line should be made to indicate the outline of the anterior boundary of the soft tissue pad across the posterior of the palate,
d. called the "post damming zone." Moisten the point
f-63. of an indelible pencil and outline these areas. Transfer the outlines to the impression while the lines are moist. Remove the impression, and score the outlines into the surface of it.

23. Post Dam the Upper Impression.

f-64-c. Black carding wax, such as Trubyte Teeth are mounted on, is an excellent material for post dam-

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d. ming. Wax is preferable for "post damming" because it may be added to just the thickness desired to make a good compression valve.

Post damming should be confined to that area of the heel of the impression, situated behind a line connecting the distal sides of the posterior palatine foramina, the distal ends of the hard areas of the tuberosities and center of the palate, and just anterior to the active muscle area of the soft palate.

The thickness of the wax post dam should nearly equal the depth of the soft tissue it rests upon. The depth of the tissue can be gauged by determining the distance that a blunt instrument can be pressed into the tissue of the post damming zone without causing pain. The distance the instrument travels, from the time that it comes into contact with the mucosa until it is stopped by the underlying bony tissue, indicates the thickness to be given to the post damming wax for that particular area.

When the wax post dam is too thick, the impression may be found to be less stable than before it was added, or the suction may be partially or entirely lost. If this happens, remove all the wax and make a new addition of correct thickness.

Insufficient material in the post damming zone may be detected by pressing upward upon the soft tissue, just posterior to the heel of the impression, with a blunt instrument and observing the action in a mouth mirror. If the instrument elevates the tissue out of contact with the heel of the impression, additional wax should be added to the post dam zone to fill the space. The post dam area should maintain contact with the soft tissue underlying it, under all circumstances.

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24. Test the Impression for Retention.

To test the retention of the impression, pull outward and upward on the bite rim in the incisor, cuspid, and bicuspid regions. When the impression is unseated, look for a fault in marginal adaptation at the point where the line of applied force crosses the margin of the impression on the opposite side of the mouth.

If the impression may be unseated when the patient says "Ah," by a forward pull on the incisor bite rim, the impression may be long and should be shortened until no space can be created between the soft palate and the heel of the impression. A mouth mirror should be used to determine the relation of impression and palate. In some mouths, saying "Ah" will cause the median tissue of the posterior part of the palate to be elevated so as to leave a "V" shaped space between it and the heel of the impression. Black wax should be added to the section of the impression affected, so that the soft tissue will be compressed permanently to the shape it assumes when "Ah" is pronounced.

Defects of adaptation frequently occur in that part of a flange which covers the tuberosities, starting at a point opposite the first molar region and extending around onto the palatal surface of the tuberosity. To correct such errors, heat the defective part of
d. the flange slowly to the "bending stage" in hot water. Seat the impression and hold it in position
d. by pressure applied to the "stop rivet." Adapt the softened area of the flange to the tuberosity with light pressure of the finger, until the compound is
d. hard enough to "stay put."

Corrections inside the impression are made with the

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"tracing stick and mouth blowpipe technic." The impression is seated and held in position by pressure on, or a little behind, the stop rivet during the conforming of the compound.

25. Instruct the Patient How to Assist in Taking the Lower Impression.

The patient must be instructed that the cheek and lip muscles are to remain in a relaxed condition
s-27. while the lower impression mass is introduced into the mouth.

Seat the upper impression and go through the procedure of taking the lower impression, using the
d. lower bite support in place of the lower "impression mass." Teach the patient what is meant by "raise
d. the tip of the tongue and touch the back edge of the upper impression," also how to withdraw or exhaust the air from the mouth, as was done in muscle trimming the upper impression. Remove, chill, and reseat the upper impression.

26. Prepare the Lower Impression Mass.

A generous surplus of compound must be used. The material must be placed on the lower tray about in the proportions of fifths, one fifth lying on the tray in the incisor region and two fifths on either side from the cuspid back. The anterior fifth should be square in cross section, while the two fifths on each side should be broad and flat with the center of the bulk of the material carried more toward the tongue than the cheek. The impression mass may be shaped to approximate the form of an impression, if the orifice of the mouth is not too small to prevent.

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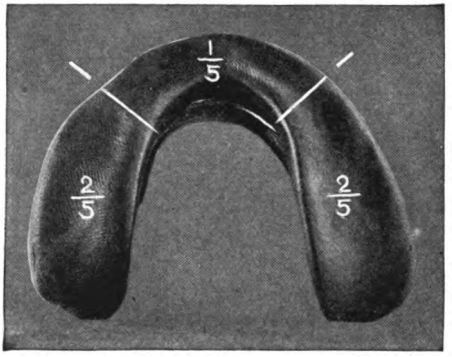

Fig. 4. Showing lower impression mass, and proportions in which compound is placed on the tray.

Procedure: Take a mass of compound from the heater, form it into a roll about 1½ cm. thick and attach it to the lower tray, so that the material is placed and shaped as mentioned above. When the mass of compound has hardened to the moulding
d. consistency, "glaze" the surface of the compound that will touch the tissue so that the middle part of the molar bicuspid section of the compound will be softened to a flowing consistency for a depth of about 3 mm. ▬. The middle of the incisor zone need not be heated so much. The margins of the molar bicuspid zone and the labial margin of the incisor zone are merely glazed. The disto-lingual margins of the mass should be rather hard and merely surface glazed.

Note: The hardened outer surfaces of the flanges act as a support for the shallow layer of soft compound in the middle, when the mass is introduced into the mouth. While the impression is being made, the harder shell retains the soft middle material and assists in forcing it into contact with the ridge when the air is exhausted.

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27. Make the Lower Impression.

f-43-B. Procedure: Place the impression mass in the mouth. Then place the tip of each index finger in contact with the lower bite rim in the bicuspid region, and press on the bite rim so as to tend to carry the fingers toward one another. In this manner the impression mass may be held and lifted until the wedges on the occlusal of the lower bite rim are guided upward into the notches in the upper bite rim. Instruct the patient to close, with the tip of
d. the tongue touching the "mid-heel" of the upper impression. Then quickly press the compound next to the cheek and lips downward and toward the ridge on the buccal and labial, with the index finger inside the mouth. The patient is now instructed
d. to bring the lips firmly together and to "withdraw the air." While the patient is exhausting the air from the mouth, pressure may be made on the cheeks to force the compound downward and against the ridge. The patient is instructed to keep the mandible in the closed position and to stop exhausting the air at the end of about four seconds. Chill the impression in position. Remove the upper impression and then the lower. Immerse both impressions immediately in ice-water.

28. Trim the Lower Base Impression to Preliminary Outline Form.

When completed, the preliminary trimming of the lower impression should leave the flanges 1 or 2 mm. ■ too long on the lingual and buccal surfaces. The final trimming, which establishes the correct
d. outline, is done after "suction" has been established.

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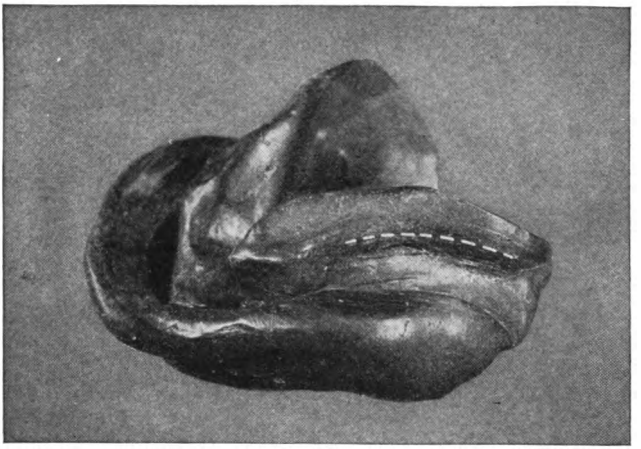

Fig. 5. Showing depression in lingual flange made by Mylohyoid ridge, and dotted line for trimming.

To trim the lower impression to the correct outline, the operator must have a mental picture of the location of the anatomical structures which de-
f-56. termine the shape of the margins of the impression. On the lingual surface of the ridge these structures are the mylohyoid muscle, attached to the mylohyoid ridge which extends from the first bicuspid region backward to a point opposite the region of the third molar; the superior constrictor of the pharynx attached a little behind the third molar area and above the mylohyoid ridge; and the geniohyoglossus attached to the genial tubercle located at the lingual base of the incisor ridge. On the buccal and labial aspects of the ridge, the buccinator muscle is attached to the upper surface of the ridge immediately behind the location of the distal surface of the third molar. In front of this region and on the buccal surface of the ridge the same muscle is attached to the external oblique line. On the outer surface of the ridge opposite and below the bicuspid-cuspid

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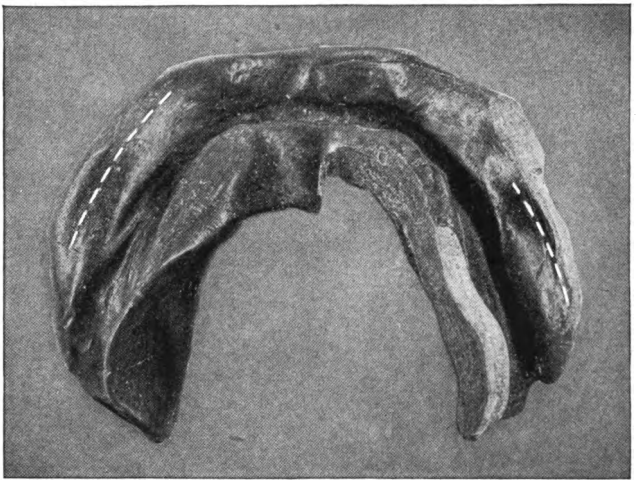

Fig. 6. Showing dotted lines at depression made by External Oblique ridge, also well trimmed lingual flange.

zone, the depressor anguli oris is attached. Below the central incisor region, the levator menti muscles arise.

To determine whether the lingual flange is trimmed correctly, one must depend almost entirely on the sense of touch plus a knowledge of the anatomy of the region.

Procedure: Locate on the lingual the indentation made, in the posterior part of the flange of the base impression, by the mylohyoid ridge. Also note the distance from the genial tubercle (frenum attachment) to the crest of the lower ridge in the median line. On the buccal, note the depression made by the external oblique line posteriorly, and note anteriorly the distance from the crest of the incisor ridge to the bottom of the muscle pocket at the labial base of this ridge. Scratch the location of these landmarks into the impression surface

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and trim to within 1 mm. ▪ of the scratch. Cut away surplus compound with a sharp knife where required, to give the flanges a uniform thickness of 3 mm. ▬ Should the flange be thinner than 3 mm. ▬ at any part, lay an ice cold cotton roll against the ridge surface of the impression flange and trace compound on the outer surface until the desired thickness is obtained. Round or blunt all sharp edges and test the impression for suction.

Note: To assist in determining the outlines for the flanges of the lower impression, a pair of blunt pointed machinist's dividers may be used to measure distances in the mouth and to locate the corresponding distances on the impression.

29. Correct Errors That Defeat "Suction".

When the lower impression has been trimmed to the approximate outline and does not show suction,
d. this may be due to imperfections in extension or
d. adaptation in the following zones, given in the order of the relative frequency with which errors are found in the respective zones. The faults usually found are given after the zone location.

(1) The heels of the impression—under-extension—poor adaptation.

(2) Incisor zone of the lingual flange—poor adaptation.

(3) The incisor zone of the labial flange—under-extension—poor adaptation.

(4) The molar bicuspid zones of the lingual flange—poor adaptation.

(5) The molar bicuspid zone of the buccal flange —over-extension, especially near the heel.

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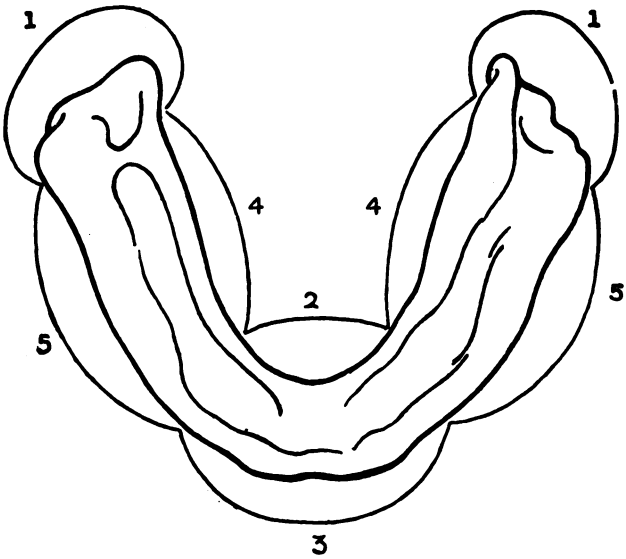

Fig. 7. Diagram of lower impression, showing zones numbered in order requiring correction.

To beginners:—Corrections for errors should be made in the order given above, unless it is definitely known where the error that defeats suction is.

To test for errors on the lingual or heel, pull outward and downward on the inner edge of the bite rim, either in the incisor region or in the right or left cuspid or bicuspid region. When a pull on the bicuspid region of the lower bite rim unseats the impression, an error in adaptation is located on the opposite side of the impression.

To test for errors on the buccal and labial, push upward and inward toward the tongue on the labial or buccal surface of the lower bite rim. If the impression is easily unseated, the error that defeats suction is probably located near the point at which pressure is applied and below it.

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Errors in adaptation in the labio-incisal region may be seen. Elsewhere they may often be located by noting where bubbles are formed by escaping air when the impression is seated. Air escapes and bubbles form where the adaptation is poor.

Under-extension of the heel or any other margin exists when digital examination indicates that the border of the heel or margin terminates on hard, unpadded tissue.

All errors, either of under-extension or poor adaptation in the lower, may be corrected without use of the upper impression as a bite support, if, when seating the lower impression on the ridge, the greater pressure is applied upon the side of the impression not being corrected. This eliminates the possibility of destroying stability in the impression.

Procedure: To correct poor adaptation of the heel, warm the posterior centimeter of the heel to the
d. "bending stage." Then seat the impression on the ridge, applying pressure to the bicuspid region of both sides. With the finger tip mould the softened material into contact with the supporting tissue un-
d. til it becomes sufficiently hard to "stay put."

d. To correct "under-extension" of the heel, trace a sufficient quantity of compound on the upper side of the heel. Seat the impression in the mouth. Pat and mould the traced material over the area of the ridge to be covered. If this does not produce a smooth surface, the roughness may be corrected by
d. the tracing stick and blowpipe technic applied to the ridge surface of the impression.

To correct poor adaptation of flanges, use the tracing
d. stick and mouth blowpipe technic, tracing a small mass of compound along the length of the area to

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be corrected and large enough in diameter to fill the defect, midway between the edge of the flange and the imprint of the crest of the ridge.

When all defects of adaptation have been corrected, the impression should exhibit suction. If it does not, and no areas of poor adaptation can be found, proceed with the technic steps that follow and make a further attempt to get suction by rebasing the lower when both dentures are finished.

30. Finish Trimming the Lower Impression.

When trimming the flanges of the lower to final shape, do not attempt at first to finish a section more than 3 cm. in length at one time. When such a section of a flange is trimmed, as much as tests indicate to be required, test the impression for suction, and if suction is lost employ the tracing stick mouth blowpipe technic to rebuild the overtrimmed section of the flange enough to restore suction. When suction is restored, or if it is not affected by trimming, proceed to trim another small section, and so on until the trimming is complete.

To test the lateral extension of the buccal flange, press upward and inward on the cheek, starting below the level of the flange to determine how much the flange extends laterally beyond the outline of the side of the mandible. If the flange projects beyond the mandible more than 1 mm., it must be trimmed until it does not. This applies especially to the section of flange in the molar zone. Trim both right and left sides for lateral over-extension.

To test the length or vertical extension of the buccal or labial flanges, grasp a portion of the lip or cheek at the level of the occlusal plane between the

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f-52. thumb and finger, pull on the cheek in the direction of the muscle action, holding the impression lightly against the ridge. If a moderate pull on the muscle lifts the impression, this indicates that the section of the flange affected by the pull is too long, and must be knife-trimmed. The important cuspid-bicuspid zone should be tested by an upward-backward pull on the angle of the mouth.

f-56. The lingual flanges of the impression may not extend more than 1 mm. ▪ below the level of the mylohyoid ridge if the alveolar ridge is of good full contour. When the alveolar ridge is flat, the lingual flange of the impression must terminate at, or slightly above, the level of the mylohyoid ridge. Trim the edge of the lingual flange of the impression with a sharp knife until examination with the tip of the finger indicates that the flange does not extend more than the indicated distance below the
f-53. mylohyoid ridge. Utilize extreme actions of the
f-54. raised tongue to test the extension of the lingual flange. Trim with the knife only where over-extension is indicated. The frenum linguae region of the lingual flange should not be long enough to press upon the frenum when the tongue is raised.

The retention is considered excellent when opening and closing the mouth will not dislodge the impression, or when moving the tongue upward and sideways will not dislodge it.

31. Break the Heels Off the Lower Impression.

If the shape of the mouth or the thickness of the bite impressions causes the heels of the lower impression to interfere with closing or lateral mandibular movements, when the two impressions are placed in the mouth, the heels of the lower impres-

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sion may be removed by fracture, and preserved to be reattached to the impression when ready to make the casts. Break off only that part of the impression heel that interferes with the upper impression or that projects above the level of the lower occlusal plane.

To control the size of the piece broken off each heel, cut small nicks in the external surface of the impression along the direction of the line which it is desired to have the fracture follow. The heel pieces are carefully preserved to be reattached. Following this technic will reduce the number of cases in which rebasing is necessary to develop suction for the lower.

32. Center the Lower Bite Rim Over the Ridge.

The middle of the lower bite rim should be directly above the middle of the lower impression as viewed from buccal to labial. The occlusal surface of the
s-53. lower bite rim should be about 10 mm. wide in the first molar section and taper from this to about 6 mm. in the first bicuspid region, and 3 mm. in the incisor section. The inner and outer surfaces of the bite rim should be so formed that the planes of the sides if extended would meet in a line about 3 cm. above the middle of the rim.

33. Establish a Height for the Lower Bite Rim.

For 90 per cent. of cases the level for the occlusal plane of the lower bite rim may be established at from 6½ to 8½ mm. above the highest point of the incisor zone of the lower ridge. In the finished denture the lower teeth always set slightly above the level established for the lower bite rim because these teeth set into the sulci of the uppers in articulation.

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A lower denture in which the lower teeth are set close to the ridge is more stable and allows greater freedom of the movement of the tongue, for handling food in mastication and for forming words in speech, than one in which the teeth are set at a higher level. Such a denture is easier to use.

Procedure: Measure the vertical thickness of the central incisor zone of the lower bite impression with a Boley Gauge and reduce the thickness of the entire bite rim so that this section will measure a maximum of 8½ mm. ▬ for ordinary ridges that have settled, and 6½ mm. ▬ for recent extraction or prominent ridge cases.

If the bite rim is too thick, cut down the incisor section to the required thickness and then heat the sections of the rim posterior to this with the blowpipe flame to a depth equal to the thickness of the material cut away in the incisor zone. Temper, and have the patient bite the lower against the upper, and close until the hard front of the lower touches the upper. Direct the patient to open, and immediately remove the lower, and chill it.

If the rim is too short, it may be built up by adding soft compound to the occlusal surface of it and adjusting the addition to the upper, under biting pressure, until the required thickness is reached.

34. Provide An Interocclusal Space of Three to Six Millimeters Between the Bite Rims.

To test for a proper amount of clearance or interocclusal space between the bite rims, have the pa-
f-67. tient say "Ohio," "Mississippi," or "when," and observe the space between the rims the instant the mandible comes to rest at the end of each word.

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Add to, or take from, the vertical thickness of the upper bite rim until an opening of 6 mm. ▬ shows between the bite rims when the mandible pauses at the end of a word. A 3 mm. ▬ space is allowed when dentures are made immediately after extraction. Do not create enough interocclusal space to permit the angles of the mouth to expand outward when the bite rims are brought into contact as in crushing food.

Note: The average length of a central incisor is 10 mm. If more than this length of the upper bite rim is exposed below the upper lip, when the lip is raised in a hearty laugh, the height of the lower rim may be increased and that of the upper decreased an equal amount, to avoid showing of pink gum facing.

When absorption of the ridges is extreme or the space between ridges is unusually wide, it may be necessary to increase the height of the lower bite rim to avoid creating too much leverage on the upper denture, or to avoid expansion of the angles of the mouth during mastication.

35. Modify the Shape of the Upper Bite Rim to Give Pleasing Form to the Upper Lip.

f-68. The right to left curvature of the upper arch should
f-69. be slightly more convex than the curvature of the
f-70. face in the same direction, viewed at the level of the wings of the nose.

To inspect the curvature of bite rim and face at the same time, take a position in front of the foot rest of the chair and crouch so that the eyes are about level with the arms of the chair. Instruct the patient to move the head so that the chin is elevated

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and then to open the mouth wide and retract the lips. The relation of the sides of the bite rim arch to the sides of the face, and also the symmetry of the curvature of the right and left halves of the arch, may be nicely determined in this way.

A common fault in the formation of the arch for artificial dentures is flatness in the anterior region. The central incisors are not given enough prominence and the cuspids too much. This gives the mouth the appearance of being full of teeth when the patient smiles, even if very small teeth are used in a mistaken effort to overcome such an appearance.

36. Mark the Median Line and Cuspid Lines.

A satisfactory way of conveniently locating a position for the median line is to make a mark just below the little pointed papillus usually found at the middle of the lower margin of the upper lip.

f-72. The position of the median mark may be verified by inspecting the relation of the papillus to the mark when the lip is at rest, and also when it is elevated as in smiling.

f-73. To locate the marks for the distal sides of the upper cuspids, take a position at one side of the patient. Imagine a line extending from a point midway between the centers of the eyes and 1 cm. above the bridge of the nose past the depression where the wing of the nose merges into the cheek, and thence across the surface of the upper bite rim. Make a mark on the lower edge of the upper rim where the line crosses it. A similar mark is made on the op-

f-74. posite side. Verify the position of this mark by using the technic described in "Professional Denture Service." Make marks on the bite rims opposite the retracted corners of the mouth to indicate the position for the bite lock notches.

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37. Record the Width for the Six Front Teeth.

f-75. The width for the six upper front teeth is found by measuring the distance around the labial of the upper bite rim from one cuspid mark to the other. The measurement should be made with the graduated side of the millimeter rule turned up.

38. Select a Form of Tooth That Will Harmonize with the Patient's Face.

To select a set of Trubyte Teeth that will harmonize with a face, use the upper central incisor as the key tooth. Select a set of Trubyte Teeth that has central incisors that reproduce, on a small scale, the distinguishing characteristics of the face.

There are four factors which may be employed in selecting teeth for edentulous patients that will greatly assist in determining the distinguishing characteristics of a face. These factors are:—outline form, proportion, contour, and size. While it is almost impossible, in a workable selection of tooth moulds, to produce forms that will absolutely harmonize in all respects with all faces, if the central incisor of the set of teeth selected closely imitates the outline form, proportions, and contour of the face for which it is chosen, a very pleasing effect will be produced when such a set of correct size is built into a denture.

f-80. The outline form of a face is determined by the slope and curve of the cheek surface located immediately in front of the ear and extending from the level of the eyes to the angle of the mandible.

To facilitate study, Dr. Williams has arranged faces according to outline form characteristics into three groups or classes.

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p-107. Class I embraces all faces that have an outline form with a predominating rectangular character. The width of these faces at the level of the eyes is about the same as the width at the angles of the mandible.

p-109. Class II embraces all faces that have an outline form of a predominating tapering character. The outline form of this class of face shows greater width at the level of the eyes than at the level of the angles of the mandible.

p-111. Class III embraces all faces that have an outline form that can not be classified as tapering or square. Such faces usually show many reflex curvatures in the facial outline and contour. Faces of this type are often wider at the level of the angles of the mandible than at the level of the eyes.

For each class, four or five distinct forms of Trubyte Teeth have been carved to harmonize with the different facial outline forms that have been isolated as related, in each class. These forms are designated in each of the three classes by the Arabic characteristics 1-2-3-4-5, and are called Form 1, Form 2, etc. Form 1 of each class is the typal form and harmonizes with the typal form of face for that class. Forms 2, 3, 4, 5 in each class, are modifications of the typal form, obtained by blending with the typal form characteristics of one or both of the other classes in different proportions. These modified tooth forms harmonize with faces presenting similar modifications. When comparing tooth forms 4 and 5 of the three classes, it will be evident that these highly modified forms have many characteristics in common. The same is true of the faces with which they harmonize.

When it is impossible to determine which class, or which form of a class, a face belongs to, the dif-

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ficulty in classifying is no doubt due to the even blending, in such a face, of characteristics of the three typal forms, making it impossible to distinguish which predominates. A highly modified form of a Class I, Class II or Class III, tooth, that is, one designated by the Arabic character 5 or 4, will produce a pleasing effect in the mouth of a patient whose face is so modified. The exact form chosen will be in any case merely a matter of personal preference, and may be determined by the decision as to which tooth looks best in the mouth.

The second important factor in the harmonious relation of tooth form to face is that of proportion. If the porcelain teeth under examination have natural characteristics, disharmony of proportion is often more evident than a slight disharmony of outline, when a patient is six or eight feet distant from the observer. The ratio of width to length, of the upper central incisor of a set of teeth, should be the same as that of the face for which the set of teeth
f-80. is being selected. The length of the face is measured from a point half way between the hair line and the bridge of the nose to the chin. The width is measured at the level of the malar prominences. There is a widespread tendency to disobey this fundamental law because of fancied mechanical objections, but it is a fact that a long tooth should never be placed in a short face, nor a short tooth in a long face, for this produces direct and conspicuous disharmony.

The third factor to be considered in selecting a tooth form to harmonize with a face is that of vertical and lateral curvature or contour. The vertical and lateral contour of the cheeks of the face should determine the character of the labial contour of the

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upper central incisors of the set of teeth used. A face having cheek lines that are flat, or minutely concave, requires a tooth with a somewhat flat labial surface to carry out the idea of harmony. Decided plumpness in the cheeks requires a corresponding plumpness in the labial surface of the tooth chosen. The strict application of this rule may be varied to produce special effects. A tooth having a flat labial surface adds a note of masculinity and strength, when combined with a slightly convex masculine facial contour. A convex beautifully rounded tooth may confer a note of feminine grace to a face otherwise coarse and masculine. Here let it be noted, however, that if the contrast between the tooth contour and the face contour is too great, a very conspicuous and unpleasant effect will result.

f-75. The last factor to be considered in selecting teeth to harmonize with the face is size. In studying the relation of the size of the tooth to the size of the face, it may be noted as often true, that large teeth of a refined form in an intelligent face are indicative of strength and forcefulness of character, while small teeth of extremely delicate form may indicate frailty or lack of forceful character. The size of tooth, especially the central incisor, should be in proportion to the size of the face as indicated by the lines for the distal sides of the cuspids. To put a large tooth in a small face produces disharmony, but a still worse disharmony is produced when a small tooth is placed in a large mouth. When the orifice of the mouth is large the other features are usually large, and to complete the harmony, a large tooth is required.

Each form of tooth is manufactured in from 3 to 5 closely graded sizes called Moulds. These moulds are designated by alphabetical characters. A dif-

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ferent group of letters is used to designate moulds in each class, but the same letters are used to indicate variations in size for different forms of the same class.

To determine the size of the set of teeth, that is, the mould to be used, note the measurement in millimeters of the distance around the labial of the bite rim from cuspid to cuspid, as previously recorded. Turn to the "Trubyte Chart of Mould Dimensions," in the appendix and in the column headed "Width of 6 Anteriors Set-up" choose a mould of the class and form selected that has a width for the six anteriors, in millimeters, approximately the same as the measurement recorded for the distance around the upper bite rim between the cuspid marks.

f-75. s-37.

To verify this selection, try the six anteriors of the mould selected in the mouth, set up on a Trubyte Selection Rim, previously bent to the curvature of the anterior portion of the upper bite rim.

f-102.

39. Select the Shade

The shades of Trubyte Teeth most commonly used in construction of full artificial dentures are Yellows 5-7-16-20-21-25, and Greys 6-10-9-15.

f-103.

It is more important to have the anterior artificial teeth harmonize in color with the coloring of the lips and adjacent facial tissues, than to attempt to secure a harmony through a consideration of the color of the hair and eyes of the patient. The lips and adjacent tissues are the frame in which the teeth set. It is desirable to have the kind of color and amount of color in the tooth selected so adjusted that the teeth will present the same weight

p-120. p-121.

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of color as the tissues, or so that the teeth are slightly lighter in weight of color than the facial tissues surrounding them. This scheme is most likely to result in the teeth being inconspicuous.

There should be a slight variation in the manner in which the component colors are arranged in centrals, laterals, and cuspids, such as is effected in Trubyte Teeth; but arranging teeth of different colors in a set is usually not desirable as this often results in attracting attention to the teeth.

40. Attach the Horseshoe Plate to the Occlusal of the Lower Bite Rim.

Shorten the four pins on the under surface of a horseshoe plate to one-third their original length.

f-193. The horseshoe plate should be placed on the occlusal surface of the lower bite rim so that when the patient closes with the mandible in the retruded position, at least 10 mm. of the anterior flat surface of the plate will be exposed in front of the upper bite rim. When the horseshoe plate is in the mouth in the position just described, have the patient bite to make imprints of the pins on the occlusal of the lower bite rim. Remove the plate and impression from the mouth and dry both.

In order to attach the horseshoe plate to the lower bite rim and equalize the biting pressure at the same

f-108. time, place the plate in position on the rim and slowly warm the surface of the plate until the pins begin to sink into the compound. Press the plate against the rim carefully, and when the plate has cooled a little, place the impression in the mouth and

f-109. cause the patient to bite upon it. Cool the compound, remove the impression from the mouth, and trim off any compound that projects above the level of the lower occlusal plane.

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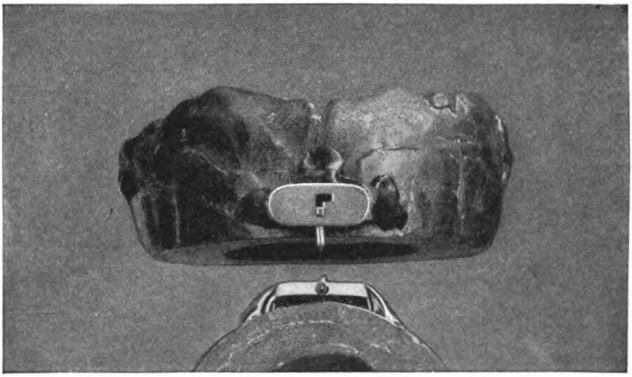

Fig. 8. Incisor path marker attached to avoid defacing the median line mark.

41. Attach the Incisor Path Marker.

The incisor path marker is attached to the upper bite rim at about the median line. The released pin of the marker must project one-third of its length below the occlusal plane of the upper bite rim.

Procedure: Heat the prongs of the incisor path marker and set the ends of the prongs into the compound half of their length. Get the marker in correct position, and attach it to the rim by dropping a small mass of fluid compound against each end and against the middle of the top of the marker. A space is left underneath the marker and the median line mark is not disturbed.

42. Blacken the Front of the Horseshoe Plate.

f-114. Procedure: The anterior 2 cm. of the horseshoe plate must be covered with black wax to prepare it for making the incisor path record. Use a thin film of equal parts by bulk of lamp black, or drop black, and beeswax. Spread the black wax with a small metal cement spatula.

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43. Record the Incisor Path.

f-115. Procedure: Instruct the patient to keep the horse-shoe plate in contact with the upper bite rim; then release the incisor path marker pin and direct the patient to move the mandible forward, then backward, several times. When the marker pin is at the front end of the record made by forward-backward movement, have the patient stop and then move the mandible to the right. Repeat the movement to the right several times from the same starting point. Have the patient make a series of movements from the front starting point to the left side. Should the patient confuse your instructions, moving in the reverse of the way directed, try suiting your instructions to the way the patient interprets them. When the path is recorded, it will be shaped like an open
f-116. V with the point directed forward. Remove the impressions from the mouth, and place in cold water until ready to adjust the face bow.

If the mouth opens during record making, the incisor path marker pin should be locked in the raised position and released only when the bite rims are in contact, in order to avoid obscure or incorrect records.

44. Make a Cross Mark on Each Cheek to Locate the Condyle Positions.

f-106. Hold a ruler against the right cheek so that the
f-109. upper edge of the ruler will be on a line from the outer corner of the eye to the upper border of the auditory canal. Place a pencil against the upper edge of the ruler and starting just in front of the auditory canal draw a line 2 cm. long. Place a blunt-ended cylindrical instrument in the opening

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of the auditory canal and measure forward from the front surface of the instrument 14 mm., at which point make a vertical line that intersects the horizontal line at right angles. Make a similar cross mark on the left cheek.

45. Adjust the Face Bow to the Width of Face.

f-192. The ends of the adapter rods should rest in light
f-194. contact with the skin of the cheek over the cross marks. This loose adjustment will prevent incorrect relations of the face bow from stretching the skin of this region and from moving the condyle mark. The number of divisions of the adapter rod, showing external to the lock nut, should be the same on both sides.

46. Lock Face Bow When in Correct Position.

The incisor path marker pin should rest at the apex or point of the incisor path tracing, when the face
f-195. bow is adjusted. Attach the slip joint stem to the
f-196. horseshoe plate and slip the universal joint of the
f-197. Snow face bow over it. The center of the adapter rod ends must rest opposite the intersection of the cross lines when the face bow is locked.

47. Cut Lock Notches in Both Bite Rims.

s-36. These notches are cut at the location of the marks made on the bite rims, in the bicuspid region. A
f-125. notch is cut in the buccal surface of the upper rim, and another in the lower bite rim immediately be-
f-126. low the one in the upper rim. *Take bite lock impressions* for the right and left sides. These impressions should be taken only when the incisor path marker pin is at rest at the apex of the triangular incisor path tracing. Each bite lock impression

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should show an imprint of the notch in the upper rim, as well as an imprint of the notch in the lower rim of the side for which the impression is made.

48. Relieve the Impression.

f-127. The areas outlined on the impression, as covering the palatine foramina and the hard center area, should now be relieved, and the retention of the impression tested. The average depth of the median relief is about 1 mm. ▪ Very flat mouths require very little median relief. High vaults with soft ridges call for maximum depth of median relief.

49. Box the Impressions for Casting.

Assemble the pieces of the lower impression. Warm the fractured surface of the impression in water at 110° F. for about two seconds. Press the end piece gently against the warmed surface until a tight joint is made. Attach the end piece to the impression with tracing stick compound applied to the labial and lingual.

f-128. Procedure: Bridge the tongue space of the lower with boxing wax. Let most of the surface of the wax, filling this zone of the lower, be parallel to the plane of occlusion excepting a small area, next to the frenum linguae notch, which should curve downward and forward, and also the triangular areas at each heel where the lower flange curves upward. Take a strip of Dentsply Boxing Wax, which is 5 mm. ▬ thick, and build an extension 6 mm. ▬ high and the thickness of the boxing wax, entirely around the upper impression, and around the bucco-labial flange and heel of the lower impression. The upper edges of the wax extension strip should come within 1 mm. ▪ of the top of the buccal flange. Attach only the upper margin of the exten-

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sion strip to the impression with a hot spatula. At-
f-129. tach a second strip of boxing wax to the sides of the extension strip, wide enough vertically to give to either cast a depth of at least 4 mm. at the thinnest part, when the top of the cast is finished flush with the top of the boxing rim. Shape the upper edge of the boxing strip so that it parallels the plane of occlusion. Sandarac the entire inner surface of the impression, and box.

Note: Be careful not to let any melted wax get on the surfaces of the bite rims which the bite lock impressions fit.

50. Make the Casts.

Materials: Spence Plaster or Weinstein's Calsilith.

Mix either material as directed by the maker. To
f-131. remove bubbles of air from the mixture, place a mass of the mixed material on a large shallow metal tray or dish and jar it by rapping smartly against the edge of a bench or by holding against a revolving flat-sided brush wheel hub or hexagonal nut attached to the lathe spindle. Place some of the bubble-free mixture in the center of the impression. Jar the impression against the palm of the hand, or lay it on a board held against the lathe vibrator, and as the plaster flows into the ridge depressions, add more until the box is filled to the top. The last additions of plaster to the upper should be made over the ridge areas, not near the center.

51. Mount the Casts in the Articulator.

Procedure: Remove the boxing wax from the casts and impressions, and clean the sides of the bite rims where the bite lock impressions are to seat. Soften, and remove the heels of the lower impres-

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sion, if it was necessary to break them off, to facilitate taking the bite. Sandarac a round area 2½ cm. in diameter in the center of the top of the upper cast, and 3 cm. in the center of the bottom of the lower cast. Assemble the bite lock impres-
f-138. sions in the correct relation to the bite rims, and seal them to the impression rims with a softened tracing stick. Adjust the face bow adapters to the condyle width of the articulator, usually so that 1½ divisions show external to the locknuts on right and left sides for the Gysi Simplex. Lock the curved incisor guide pin in the articulator. The top of the pin must be level with the top of the sleeve that receives it. Slip the horseshoe plate pins into the slip joint stem. Work the casts between the bows of the articulator and snap the face bow adapters on to the articulator lugs. Place the anterior supporting block on the slip joint stem, insert the straight guide pin in the small vertical hole of the supporting block, and raise the front of the slip
f-198. joint stem so that the plane of occlusion is parallel to the top of the flat surface on which the articulator rests, then lock the device.

Plaster the upper cast to the upper bow. The plaster should be 5 mm. ▬ thick over the bow wherever it touches it. Loosen the adapter rods when the plaster is set, and disconnect the face bow at the slip joint. Turn the articulator upside down and work thin plaster under the lower bow, and between it and the cast. Then cover the upturned bottom and sides of the lower bow about 5 mm. ▬ thick. *Be sure the flat rotation pins, set in the upper part of the articulator, touch the flat vertical surface of the lower part of the articulator,* against which they slide when the articulator is in motion.

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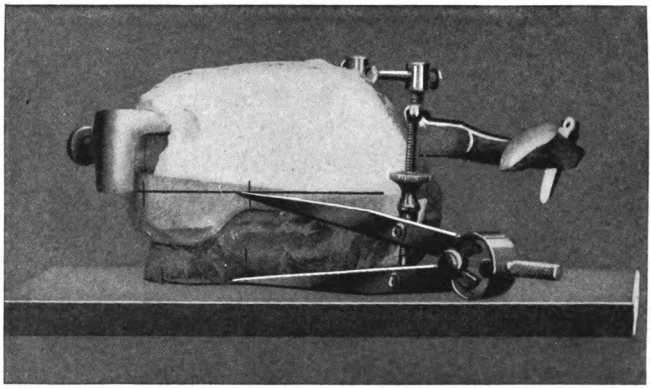

Fig. 9. Showing method of scribing line on upper cast parallel to plane of occlusion.

When the plaster that holds the casts to the articulator bows is set, remove the bite locks.

Note: Be sure that the straight and curved pins are the same length from tip to top. Shorten the curved pin if they are not.

52. Make a Set-Up Rim for the Lower.

f-156. Disconnect the upper section of the articulator from the lower. Soften and remove the lower im-
f-145. pression from the cast. Scribe a line on the upper cast parallel to the plane of occlusion. Record the distance from the line to the plane of occlusion. Mark the location of the median line, also the position of the distal side of each cuspid on the upper cast. Reassemble the sections of the articulator. Adjust the incisor guide pin to open the bite about 1 mm. ∎ Open the articulator. Soften and mould some old compound into a roll about 13 mm. in diameter, bend it into a "U," and place it on the ridge of the lower cast. Close the articulator, and mould the outer surface of the soft rim to follow the outline

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of the outer surface of the incisor cuspid section of the upper bite rim. Allow the rim to harden. Set the incisor guide pin so that its top is flush with the top of the sleeve that holds it. Slightly vaseline the upper bite rim, and soften the occlusal surface of the set-up rim. Close the articulator until the incisor guide pin just touches the guide incline. Trim off surplus compound that may extend above the occlusal plane of the set-up rim, on buccal or lingual. Trim the labial surface of the incisor-cuspid section of the set-up rim, flush with the corresponding section of the upper bite rim. Remove the upper impression from the upper cast.

53. Draw a Plan on the Set-Up Rim to Assist in Placing the Bicuspids and Molars.

The lower bicuspids and molars should be set so that the center of each tooth will be vertically above the middle of the lower ridge. Draw on the set-up rim lines that will indicate the lateral boundaries of the zones within which the upper molars and bicuspids may be set to accomplish this.

Procedure: Locate on the lower cast, the straight middle sections of the molar bicuspid regions of the lower ridge. Make a mark at the posterior end of each section directly across the ridge, at right angles to it. Extend this line across the lingual surface and buccal flange of the cast. Draw a similar line across the anterior ends of the straight sections, near the probable location of the mesial surface of the second bicuspid. Mark the bucco-lingual center of the ridge on each of the four cross lines. Hold a straight edge in line mesio-distally with these center marks for one side. Keep the straight

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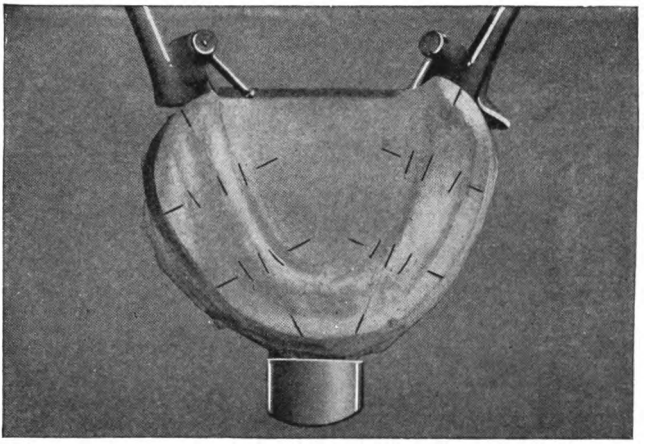

Fig. 10. Lower cast with preparation for indicating position of lower ridge on the set-up rim.

edge horizontal laterally if it is flexible. Draw a line along the straight edge, across the heel extension of the cast and across the labial extension of the cast. The anterior part of the line will cross the cast about in the cuspid zone.

Place the set-up rim on the lower cast and line the straight edge up with the marks that show on the labial and heel extensions of the cast. Place a sharp instrument against the straight edge and scratch a line on the occlusal surface of the rim. The middle section of this line on the rim will be vertically above the similar section of the lower ridge. Directly above the distal transverse lines on the cast, make two marks on the set-up rim, one to the buccal of the center line 5 mm. ▬ distant from it, and one to the lingual of the center line 4 mm. ▬ distant from it. Make marks on the rim in like manner above the anterior transverse lines on the bicuspid zone of the cast, the buccal one 3 mm. ▬ distant from the center line, and the lingual 2 mm. ▬

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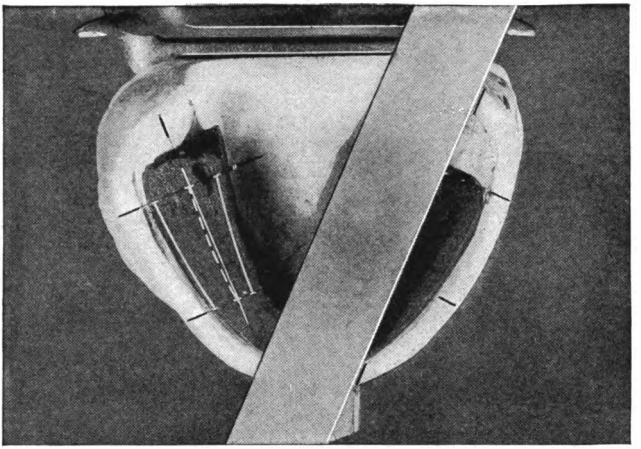

Fig. 11. Bicuspid molar zone on left, and straight edge in place for drawing middle line on right.

distant from the center line. Connect the buccally placed marks with a slightly convex line, which parallels the curve of the adjacent buccal margin of the lower ridge. Connect the lingually placed marks with a similar line. These lines bound the zone within which the upper bicuspids and molars should be placed, in order to have the lower bicuspids and molars placed above the middle of the lower ridge. Remove the set-up rim.

54. Make Baseplates for Both Casts.

f-146 to f-151.

Time may be saved and accuracy of adaptation increased, if the two baseplates are made simultaneously by heating and moulding a section of one while the moulded section of the other is cooling, and vice versa. The mouth blowpipe may be used to advantage to soften the baseplate for adapting, while in place on the cast, if the cast has been previously rubbed with talcum or soap stone. The margins of the baseplate should be turned over for

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a reinforcement. The lower baseplate is set aside until the upper teeth are set. Attach the set-up rim to the lower cast and the baseplate to the upper cast.

Note: Preparation for producing a thin or wafer palate of uniform thickness for the upper denture may be made as follows: Adapt a piece of No. 7 tray metal, or Giffen tray metal, to the palate of the upper cast, before adapting the baseplate material. The metal should reach to the limit established for the heel of the denture and cover all of the palatal aspect of the ridge, but should not extend far enough to the buccal or labial to come under the teeth when set. This metal piece is left in place on the cast while the baseplate material is adapted to the cast, and is allowed to remain attached to the baseplate until the trial denture is ready for flasking, when the palatal portion of the baseplate material is removed and the metal is left.

55. Prepare to Set the Upper Teeth.

Assemble the articulator having the incisor guide pin in place, and fit two blocks of soft wax between the heels of the upper baseplate and the lower set-up rim to support the upper cast and maintain the correct bite opening. When the blocks are hard, attach them to the upper baseplate. When the incisor guide pin is removed to facilitate setting the anterior teeth, the blocks will maintain the bite opening.

A wax bite rim is not made for the upper, in order to economize time. The incisors and cuspids are set to average inclinations, and to the curvature and

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fullness indicated by the shape of the incisor-cuspid section of the set-up rim. The result is the same as that obtained by using the wax bite rim. To attach the teeth to the baseplate, the following is suggested. Mould a half root of wax on each tooth as it is taken off the card to be set in position. Press this wax "root" against the ridge where the tooth is to be placed, and manipulate the tooth into position while the wax is pliable. When the tooth is in position it is sealed to the baseplate with a hot spatula. Only enough wax is used in setting each tooth to form a foundation for the tooth. No wax is added above the teeth on the bucco-labial surface of the baseplate, until the teeth are articulated and tried in. This reduces the chance of producing errors in articulation from wax shrinkage.

Whenever the bite is close the baseplate material covering the cast may be easily reduced to a minimum thickness with a hot spatula, if a layer of tissue tin foil is first placed between the baseplate and the cast.

56. Arrange Upper Anterior Teeth.

Set the centrals, laterals, and cuspids in pairs, as this procedure gives a better opportunity to develop a symmetrical arch curvature. The labial surfaces of the tips of the incisors and cuspids are placed so that they will be flush with the labial curvature of the set-up rim below them. The arch is given the lateral curvature indicated by the set-up rim. The labial surface of the cuspids should face in the same general direction as the buccal surface of the bicuspids. The teeth should be set so that their long axes incline as in the sketch, starting with the incisive as pivotal.

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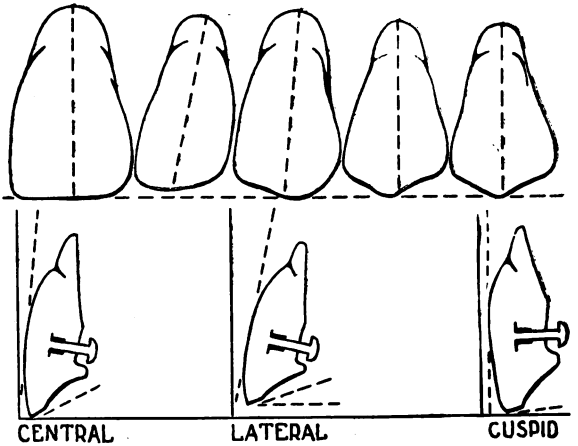

Fig. 12. The dotted lines indicate the inclinations for the upper anterior teeth, front and side views.

The upper cuspids should be set so that their mesio-lingual axes will approximately parallel the cheek. When the anterior six teeth are correctly set, it is necessary to look directly into the front of the mouth to see the full width of the central, and to look into the mouth from the right or left side of the patient to see the full view of the cuspid.

A pleasing variation in position for the laterals is made by depressing them enough so that a straight edge, applied horizontally to the labial of the lateral, will simultaneously touch the distal of the central and the mesial of the cuspid. Class III laterals are well adapted for developing slight lap lateral effects.

s-52. Set a pair of dividers to the measurement recorded for the distance between the plane of occlusion and the line scribed on the upper cast. By measuring with the dividers from this line to the cutting edge of any tooth, it may easily be determined whether the tooth is being raised or lowered in process of articulation.

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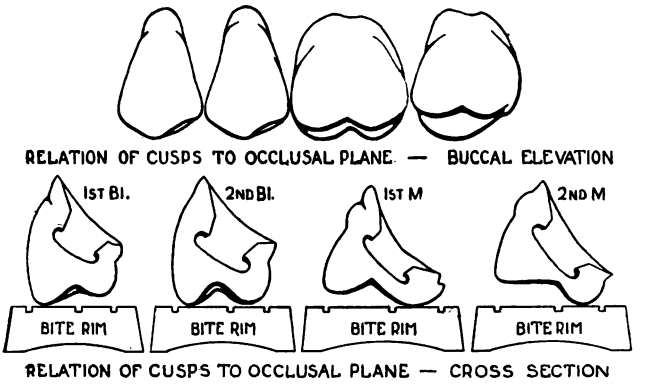

Fig. 13. Relation of buccal and lingual cusps of the upper bicuspids and molars to the occlusal plane.

57. Set the Upper Posterior Teeth.

The following suggestions for setting the posterior teeth, when followed, will greatly facilitate proper articulation.

Take the median line or sagittal plane as a base. A line connecting the apex of the buccal with the apex of the lingual cusp of any Trubyte bicuspid should f-164. intersect the base line at an angle of about 22°. The same is true of a similar line projected through the apices of the mesial pairs of cusps of the molars. Lines connecting the apices of the buccal and lingual pairs of cusps should all be parallel on a given side.

The mesio-distal inclination of the bicuspids and molars for minimum degree of compensating curve will require the bicuspids to set with their longitudinal axes almost vertical, as viewed from the side. The vertical axes of the molars will slant slightly upward and forward toward the bicuspids. As the curve increases the forward slant of the long axes of the molars becomes more marked.

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A space of 1 mm. ▪ should be left between the first bicuspid and cuspid, and between the second bicuspid and first molar, on both sides of the upper arch.

Procedure: Set the upper bicuspids and molars so that a vertical line, tangent to their lingual surfaces, will pass through the innermost line on the surface of the set-up rim, or so that the center of each tooth is above the middle line on the set-up rim. Set the bicuspids so that both buccal and lingual cusps touch the set-up rim. Let the lingual cusps of the molars touch the surface of the set-up rim, but raise the buccal cusps of the first molars 1 mm. ▪ and the buccal cusps of the second molar 2 mm. ▬. A line tangent to the buccal cusps of the first and second upper molars should be nearly parallel to the median or sagittal plane.

Note: Technically, the lingual cusp of the first bicuspid should be raised ½ mm. above the level of the set-up rim.

If the buccal cusps of the molars are raised a little more than the amount specified, or 1½ mm. ▪ and 2½ mm. ▬ respectively, when an error in adjustment occurs, involving a space between the upper and the lower buccal cusps on the working side, the buccal of the upper molar should be depressed into contact with the lower molar.

58. Setting the Posteriors to a Steep Curve.

It is often possible to increase the stability of the lower denture and the comfort and ease with which it may be worn by developing an antero-posterior curvature, or compensating curve, in the arrangement of the occlusal surfaces of the lower bicuspids

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and molars, that will parallel closely the curve of the lower ridge.

The practicability of developing much compensating curve will depend upon the shape of the upper tuberosities and upon the shape of the anterior part of the palate of the upper.

If the front of the vault is relatively flat and the tuberosities are not prominent enough to be useful in keeping the upper denture from being displaced forward, only slight curvature should be attempted.

If the lingual surface of the slope of the incisor ridge and anterior palate parallels, or is steeper than, the pitch of the rear third of the lower ridge, the second bicuspids and molars may be set to a curve that will parallel the slope of the lower ridge.

Procedure: Set the first upper bicuspid, then carve an antero-posterior curve of the desired pitch in the lower set-up rim, back of the first bicuspid. If conditions permit, this curvature may be partly formed by building up the heel of the set-up rim. From lingual to buccal, the curved rim should be horizontal like the flat one. Reproduce the lines that determine the location of the molars and bicuspids. When setting the bicuspids and molars, the buccal cusps are given the same relation to the curved set-up rim as advised for the flat one.

59. Learn to Manipulate the Articulator.

When you have familiarized yourself with the character of movement of the articulator made by
f-170. the manipulation described in "Professional Denture Service," it is not essential that the articulator be always operated in precisely the way described therein, if the same movement is made, that

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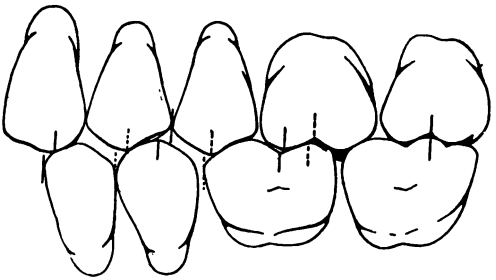

Fig. 14. The lower bicuspids and first molar are in incorrect working bite relation to the uppers. They should be shifted to the distal until the upper and lower solid and dotted pairs of lines coincide as for the second molars.

is, if the vertical guiding flange of the fossa of the balancing bite side of the articulator is kept in contact with the inner surface of the condyle pin, during side movements.

60. Articulating Molars and Bicuspids.

d. In studying "articulation," the positions the lower teeth may assume in relation to the upper teeth are divided into four phases called the Rest, Working, Balancing, and Incising Bites, or contacts.

f-167. When either side of the articulated case is in the working bite position, the molars and bicuspids should intermesh perfectly, viewed from the buccal; and viewed from the lingual the bicuspids and molars should intermesh up to and including the second bicuspid. When either side of the articu-

f-168. lated case is in the balancing bite position, the lingual cusps of the second upper bicuspid and first upper molar should be in contact with the lower opposing teeth. The first upper bicuspid and second upper molar may touch the opposing lowers in the balancing contact, but this is not always necessary.

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The following suggestions as to where and how to grind molars and bicuspids to assist in articulating them will be found useful. The pitch of the buccal and lingual inclines of the mesial and distal marginal ridges must often be increased. This is effected by cutting into the middle of the ridge, just above the point of proximal contact, with a triangu-
f-174. lar shaped stone like the Miller No. 235. The stone should be applied so that it revolves in a mesio-distal direction. The mesial and distal marginal ridges of adjacent teeth may be altered at the same time by holding the center of the stone above the point of proximal contact of the teeth being altered.

When upper and lower buccal cusps strike too heavily in the working bite relation, and when it is impossible to effect an adjustment by shifting the position of the upper tooth, grind the upper buccal cusp. When upper and lower lingual cusps interfere in the working bite position, grind the lower lingual cusp.

In the balancing bite relation, if a lingual triangular ridge of an upper molar or bicuspid rides so heavily in the disto-buccal triangular groove of the opposing lower tooth that the teeth on the working bite side of the articulator are lifted out of contact during lateral movement, the pitch of the groove and the ridge must be made flatter, or nearer horizontal. This error is usually limited to the balancing bite contacts made by the lower second molar. If a very abrupt compensating curve is developed, the number of teeth requiring adjustment of this kind, and the amount of adjustment at each point of contact will increase as the curve increases.

To adjust the lower triangular groove, take a No. 235 stone and deepen the groove. Start near the

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fossa end of the groove, and increase the depth of the groove, on a straight line, as the buccal end is approached. The pitch only is to be altered. The character of the groove should be retained.

To flatten the pitch of the upper lingual triangular ridge, cut away from the faces of the ridge. Start cutting near the fossa end of the ridge and increase the depth of material cut away, on a straight line, as the lingual end is approached. Only the bucco-lingual pitch of the ridge need be altered. When the adjustment is finished, the ridge of the upper tooth should slide in continuous contact with the groove of the lower in the balancing movement, without lifting the teeth on the working bite side out of contact.

Heavy contact in the rest bite, unless due to an obvious error in form of one of the teeth, requires that as much of the grinding be done on the upper tooth as on the lower.

61. Articulate the Left First Lower Molar.

The following sequence of adjustments will greatly reduce the time required to articulate Trubyte Teeth satisfactorily.

f-179. (1) Set the lower molar in occlusion with the upper molar, so that the crushing surfaces of the lower buccal cusp and the upper lingual cusp meet in the rest bite.

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(2) Rotate the upper molar to the correct position for the balancing contact. Watch the relation in the balancing movement, of the mesial triangular ridge of the first upper molar to the buccal notch at the outer end of the disto-buccal groove of the first lower molar. Rotate the first upper molar until the mesio-lingual triangular ridge of the upper molar slides directly through the disto-buccal notch of the lower during balancing bite movement.

(3) Rotate the lower molar until the center of the middle buccal cusp is directly under, but not necessarily in contact with, the middle buccal groove of the upper molar, when these teeth are in the working bite position, and examined from the buccal.

When examined from the lingual, the point of the mesio-lingual cusp of the first upper molar should be directly above the middle of the lingual groove of the lower molar in the working bite.

(4) Depress the buccal cusps of the upper molar, until they come into contact with the buccal cusps of the lower molar in the working bite.

(5) Raise the lingual cusps of the lower molar until they touch the lingual cusps of the upper molar in the working bite relation.

When the adjustment has been made, close the articulator in the rest bite position and carefully watch to see if either of the molars move. Return the articulator to the working bite position. If the upper and lower buccal cusps touch, and the upper and lower lingual cusps touch correctly, the articulation of the molars is finished.

If the buccal or lingual cusps do not touch when

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holding the articulator in the working bite position, depress the buccal of the upper and if necessary raise the lingual cusps of the lower molar into contact. Close the articulator slowly to the rest bite position, and when the molars touch, note the points that hit first and relieve these points by grinding until the articulator will close without altering the working bite articulation of the molars.

62. Articulate the Left Bicuspids.

f-181. Articulate the second upper bicuspid to the lower
f-182. molar, then the second lower bicuspid to the second
f-183. upper bicuspid, and so on, until the bicuspids are set. The principles that govern the setting of the
p-203. molars also govern the setting of the bicuspids. The tip of each bicuspid should take a position vertically opposite the contact point of the opposing teeth, when they are placed in the working bite relation.

63. Articulate the Right Molars and Bicuspids.

64. Test the Width of the Lower Anteriors.

When the relation of the upper and the lower ridges requires substitution of lower anteriors, make the change at this time.

A mould having a greater or lesser width of "6 Lower Anteriors Set-up" may be chosen by consult-
d. ing the Articulation Chart for lowers in the appendix. In this chart the moulds are given in the first column according to Class, Form, and Size. The last column contains the numbers of lower moulds of the same width which may be substituted for the first mould in the line. Short or long lower
d. anteriors of a given width may be found by con-

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sulting column 2 of the Trubyte Dimension Chart, for length, and column 3 for width of the six lowers. The lengths of the laterals and cuspids, not listed, are proportionate to the length of the centrals in each set.

Note: If there is any doubt as to the fitness of the mould and shade selected to meet the requirements of any case, do not grind any of the anterior twelve teeth until after a try in. Set the anterior lower six teeth so that they will not interfere with the anterior upper teeth in lateral movement.

See definitions under Classification by Ridge Relation in appendix for arrangement of anteriors for abnormal cases.

65. Examine Trial Dentures in Mouth.

The bite relation will be found correct if the technic for taking the bite and mounting casts in the articulator has been carefully followed. If there is an
d. "incorrect bite relation," correct it. After the ten
p-207. anterior upper teeth have been arranged to produce
p-208. a pleasing appearance, add wax to the baseplate above the upper teeth to determine how much is needed to give additional fullness to the lip.

The technic followed in the arrangement of the anterior teeth in this book is for average cases. If, on examination of the dentures in the mouth, any changes in the position or arrangement of the anterior teeth seem necessary, such changes should be effected at this time. The changes usually made consist of depressing or rotating the laterals, or changing the inclination of the centrals, or rotating them to make the mesial angles prominent or to depress them. It is necessary at times to drop the

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upper incisors a little below the level of the plane of occlusion to produce a pleasing effect.

The form of the arch of the upper denture should harmonize with the contour of the patient's face, from side to side, at the level of the base of the nose. This arch curvature is usually reflected in the upper cast. The form of arch for a patient requiring a square tooth will be much flatter in the incisor region than that for a patient requiring a tapering tooth.

Every effort should be made to so arrange the anterior upper teeth that the high lights will be reflected from different areas of the centrals, laterals, and cuspids. This may be produced by a slight alteration of the inclination of the vertical axes of these teeth, and also by rotating them slightly on their longitudinal axes. When the high lights are reflected from different areas of the centrals, laterals, and cuspids, the denture will be more pleasing to the eye of the observer, and is less liable, therefore, to invite study of the teeth than is the case when perfect uniformity in position of high lights is effected, through a regular uniform arrangement of the various teeth in the arch.

It is usually possible to effect a more satisfactory change in the appearance of the upper lip by altering the antero-posterior position of the anterior upper teeth, than can be effected by manipulating the wax gum. If it is desired to make the center of the upper lip more prominent, this may be done by carrying the upper incisors forward the required amount without changing the inclination of their long axes. If it is desired to flatten the contour of the upper lip, this may be done by carrying the upper incisors toward the lingual to produce a flatter arch.

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66. Articulate the Upper and Lower Cuspids.

The proper articulation of these teeth can be effected only by careful grinding with a flat stone.

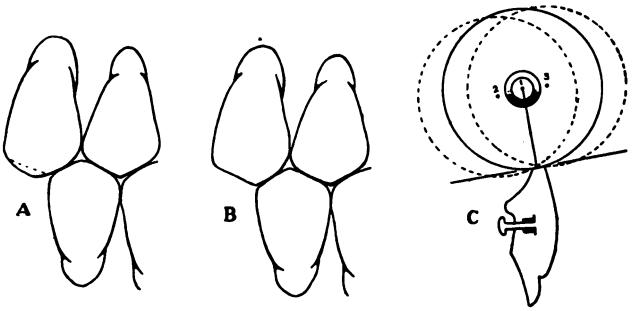

Fig. 15. Mesial facet of upper cuspids (A) before grinding to correct relation in working bite, (B) after grinding, (C) relation of center of stone to the long axis of cuspid for grinding bucco-lingual pitch on the facet. Solid circle, center 1, shows correct position, dotted circles, centers 2 and 3, show incorrect positions.

(1) If necessary, lengthen the antero-posterior slope of the mesial facet of the upper cuspid, so that the point of the cuspid will be directly above the mesial contact point of the first lower bicuspid, when they are in the working bite relation.

The mesial cutting edge of the upper cuspid should
f-184. be so ground that its slope will be the same as, or a little flatter than, the slope of the mesio-buccal margin of the bicuspids.

f-186. (2) Bevel the mesial and distal facets of the upper cuspid slightly to the palatal, so that a straight edge, held in contact with the width of the bevel of either facet, will point to or touch the wax at the neck of the mesio-lingual cusp of the first upper molar of the opposite side. To bevel the facet, use a stone about 2 mm. ▬ or 3 mm. ▬ wide, and hold it against the facet so that the center of the stone is

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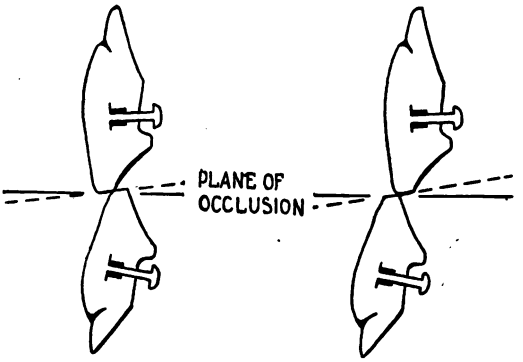

Fig. 16. Cuspids in rest and beginning of working bite relation, showing dotted line indicating proper bucco-lingual inclination for these cusp facets.

about 1½ mm. ■ distant, (toward the lingual) from the buccal edge of the facet. The stone should revolve toward the buccal surface of the cuspid and be moved forward and backward in a straight line inclined at the proper angle to develop a flat plane for the facet.

(3) Remove the upper lateral until the lower cus-
f-183. pid is adjusted. Grind the distal facet of the lower cuspid to parallel the antero-posterior inclination of the mesial facet of the upper cuspid.
f-185. The tip of the lower cuspid should be directly below the mesial contact point of the upper cuspid, when they are in the working bite relation.

(4) Bevel the distal facet of the lower cuspid so that the buccal pitch, or inclination, of the facet parallels the bucco-lingual inclination of the mesial facet of the upper cuspid. Grind the bevels of the opposing facets of upper and lower cuspids, so that the mesial facet of each upper cuspid will slide in contact with the distal facet of the opposing lower cuspid during the working bite movement.

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(5) Replace the upper lateral, and grind a facet on the distal of the upper lateral and on the mesial of the lower cuspid that will parallel one another. The lower cuspid should just escape contact with the lateral, both in the working and incising bite movements.

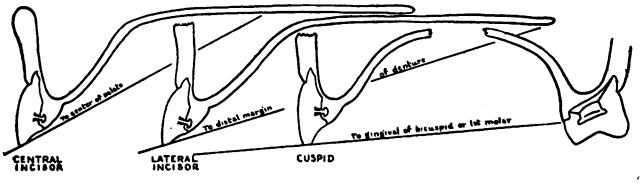

Fig. 17. Showing angle of bevels of upper incisor facets. A straight edge laid against each bevel should take the direction of the line touching each bevel.

67. Bevel the Edges of the Upper Incisors.

p-204. Grind a facet on the incisal of the upper lateral so that a straight edge, resting in contact with the facet of either lateral will touch the posterior margin of the upper baseplate at the median line.

Grind a facet on the incisal edge of the upper central so that a straight edge, that touches the width of the facet of either central, will touch the center of the palate of the upper baseplate in the median line.

68. Articulate Lower Incisors to the Uppers.

Set the lower laterals directly above the antero-posterior center of the lower ridge. Adjust the bevel of the facets of the upper laterals and centrals, so that each lower lateral will slide in contact with the upper lateral facet in the working bite and with the upper central, or central and lateral facets, in the incising bite.

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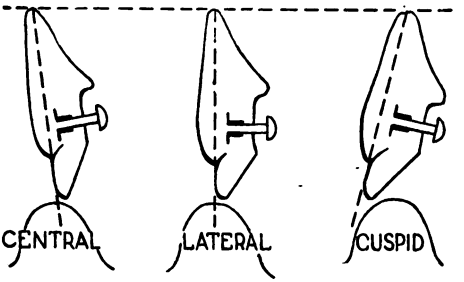

Fig. 18. Relation of lower cuspids and incisors to ridge, and average inclination for long axes.

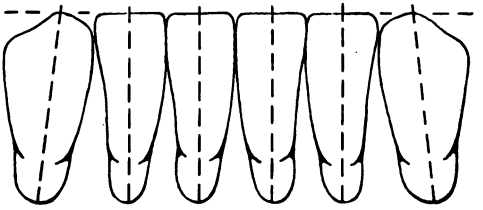

Fig. 19. Inclination of long axes of lower incisors and cuspids buccal view. Side view above.

Set each lower central so that it is vertically above the antero-posterior center of the lower ridge. Adjust the facet of the upper central until the lower central will slide against the facet of the upper central in the incising and working bite movements. If the lower incisors are too long, they must be shortened, first by grinding the collar or neck of the tooth, and if sufficient adjustment cannot be made in this manner, also by grinding the incisive or cutting edge of the tooth as well.

When the cutting edge of the lower incisors is to be ground away to a depth of 1 mm. or more, the grinding should be so done that the bevel created will face the lingual to make the incisor more efficient for cutting, and to prevent locking in the

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incising bite, which may occur if the bevel is made on the labial, as in nature, and the mandible is accidentally closed when the lower incisors are anterior to the uppers, in incising.

69. Articulate the Second Lower Molar.

If the second molars are not set and adjusted as the last step in the procedure of articulation, they will usually interfere with the correct arrangement of teeth anterior to them, by wrongly guiding the movements of the articulator. This is especially true when a steep compensating curve is developed. Modify the distal triangular groove of the second lower, and also the pitch of the triangular ridge of the second upper molar, and the distal triangular ridge of the first upper molar that moves in the mesial triangular groove of the second lower molar, to permit balancing bite movement without interfering with contact of teeth on the working bite side.

Note: When a pronounced compensating curve is developed, it is often advantageous to grind a sufficient amount of material off the adjacent proximal contact points of the first upper molar and the second upper molar, to permit the second molar to be set forward 1 mm. ∎.

70. Test Set-Up in Incising Bite Relation.

Beginning with the incisors, the upper teeth should come into contact with the lower teeth in the incising bite relation, in the following order:

f-189. Lower incisors with the upper incisors. The upper
f-190. laterals do not touch the lower laterals, in certain arrangements of these teeth.

Upper cuspids with the first lower bicuspids.

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First upper bicuspids with the second lower bicuspids. This is not essential.

Second upper bicuspids with the first lower molars.

First upper molars with the distal of the first lower and the mesial of the second lower molars.

The second upper molars may touch the distal of the second lower molars, but this is not obligatory. A space between the upper and lower second molars in the incising bite relation is better than a heavy contact.

71. Wax Up and Festoon the Trial Dentures.

If the thin tray metal was placed in the palate of the upper, the baseplate material, which covers it, may now be cut out with a very hot spatula, and the joint between the remaining baseplate and metal smoothed out. Should the metal used fail to result in a palate of desired thickness, a layer of 28 cast gold wax may be adapted to the exposed surface of the metal.

Attach the periphery of both dentures to their respective casts with wax and a hot spatula. Do not develop a greater thickness for any surface of either denture than is essential for strength or esthetics, or to allow for wear in polishing. The amount of rubber in a denture partially determines the degree in which the denture may suffer a change of form in vulcanization.

The use of melted wax in festooning is to be avoided, if the shrinkage of wax and its effect on the articulation is to be reduced to the minimum. Wax softened to a plastic condition is best.

Do not form crevices between the teeth. Fill the interdental spaces to a moderately convex form, so

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that these areas may be easily prepared for polishing with sharp vulcanite chisels.

The carving or festooning of the bucco-labial surfaces may be done, when the wax is almost set, by scraping and moulding with the broad end of a No. 7 wax spatula or other suitable tool. The spatula must be kept warmed to about 100°F. to facilitate carving and moulding.

Picture in your mind the plan of festooning that you wish to carry out for each case. The best aid in acquiring such a plan is a series of study casts made from impressions of the boldly festooned natural gums, which also include labial surfaces of the eight anterior teeth. The contour of the gum of vulcanite dentures must be somewhat more bold than natural gum contour, because the dentist is limited in his attempts to imitate natural gum appearance to effects produced by high lights and shadows only, while Nature often magnifies the apparent contour of the gum by the use of color gradations.

A slight excess thickness of wax should always be allowed to remain on the surfaces that are to be festooned, to compensate for the reduction of thickness incidental to polishing.

72. Perfect Articulation by Grinding With Carborundum and Glycerine in Articulator.

Apply liberally a thick mixture of carborundum (copper-carbo powder answers well) and glycerine to the occlusal surfaces of the lower posterior teeth and to the lingual and incisal of the anterior upper teeth.

Grasp the upper section of the articulating frame in one hand and the lower section in the other; hold

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the back of the articulator against the chest so that the left buccal surface is upward, and support the forearms by drawing them in against the sides of the trunk. Open the articulator 2 mm. ■ and move the lower section laterally enough to put the teeth of the left side into the working bite relation; close the articulator until the teeth touch lightly and slide the lower against the upper in imitation of grinding in mastication, until the rest bite is reached. Open the articulator and repeat the grinding operation until the upper teeth slide on the lowers without any hindrance or "bump." Be sure that the fossa of the balancing side of the articulation is kept in correct contact with the condyle pin.

Hold the articulator with the right side facing upward, and grind this side.

To grind for the incising bite, open the articulator 2 mm. ■ until the lower incisors can be brought forward into contact with the upper incisors at the extreme incising position, and then return with a slide to the rest bite position. Repeat this operation until the teeth slide smoothly.

73. Prepare the Trial Dentures for Flasking.

Place a Rugae form in the palate if desired. Tin
f-203. foil the palate, using one or two pieces of No. 60 foil for the purpose and allowing the foil to cover the lingual of the upper teeth up to the dividing line between the lingual and the occlusal or incisal. Clean the exposed surface of all teeth entirely of wax by scraping with a knife or spatula.

The use of wax solvents for polishing the carved areas is not contra-indicated, but if carelessly done the solvent will penetrate under the teeth and cause them to come loose and shift in flasking.

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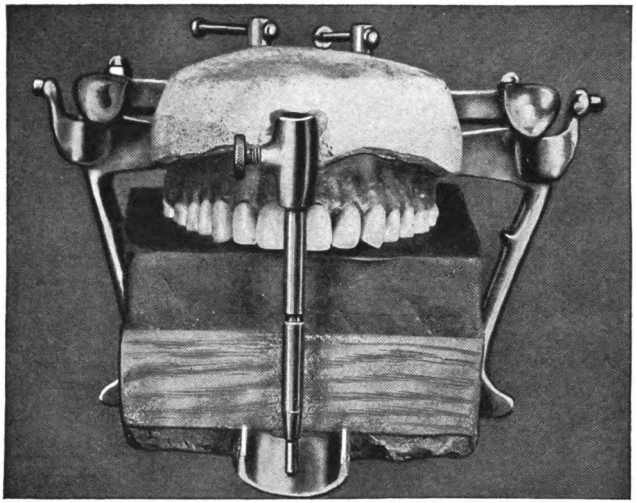

Fig. 20. The occlusal surfaces of the upper bicuspids and molars making imprints in the plasticine as a guide to remounting.

74. Prepare for Remounting the Dentures.

Remove the lower trial denture and cast from the lower bow of the articulator, but do not remove the upper cast and trial denture. Set the incisor guide pin so that the top of the pin is even with the top of the sleeve in which it works, and lock it in this position. Take a lump of plasticine large enough to more than fill the space between the upper teeth and the lower bow when the articulator is closed. Raise the upper bow of the articulator and mould the plasticine, against and under the lower bow, so that it becomes attached to the bow. Flatten the surface of the plasticine that faces upward until, when the articulator is almost closed, the upper posteriors will touch the plasticine and the incisor guide pin will be kept out of contact with the incisor guide incline by about 5 mm. A small piece of wood 7 cm. square by 3 cm. thick,

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covered top and bottom with plasticine, may be used instead of the solid mass of plasticine, if preferred.

Moisten the occlusal surfaces of the posterior teeth and close the articulator until the incisor guide pin touches the incisor guide incline on the front of the lower bow. The teeth of the trial denture will be pressed into the plasticine far enough to leave a shallow imprint of their cusps in the plasticine. Remove the upper section of the articulator from the lower section, and detach the upper cast and trial denture from the upper articulator bow without interfering with the plasticine on the lower. The plasticine is left on the lower bow of the articulator until the dentures are polished.

75. Invest Casts in Lower Sections of Flasks.

The materials used for flasking investment are a stiff mixture of equal parts of Spence plaster and plaster of Paris, or pure Weinstein's Calsilith. Occasionally plaster of Paris alone is used in investing the cast in the lower portion of the flask, when time must be economized.

f-204. The casts should be so placed in the lower sections of the flasks that the investing plaster may be finished to slope only slightly in a straight line from the outer edge of the upper surface of the cast extension to the inner edge of the flask rim. The slant of the investment should be as nearly horizontal as the outline of the cast will permit.

The slant of the investment from the cast to the flask on the sides and front should not deviate more than 25° from the horizontal.

Prominent or undercut ridges in the incisor zone of the upper cast require the cast to be placed well forward in the flask, and to be set so that the heel

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may be depressed until the labial surface of the ridge is parallel to the line of movement of the upper section of the flask, when it is removed from the lower section. This will assist in preventing the intermixture of pink and base rubbers.

High heels on the lower cast are treated in the same manner as undercut ridges for the upper.

When it is necessary to depress the heel of either the upper or lower cast below the level of the rim of the flask more than the average amount, the investing plaster behind the back of the cast may slope upward abruptly to the inner edge of the flask rim. For the lower case, when the heels are depressed, the investment material may be run forward on to the posterior third of the tongue zone to lessen the slope of investing plaster from cast to flask rim.

Procedure: Fill the cup section of a flask almost to the top with a mixture of investing plaster. Place the moistened cast upon the plaster and press it into it until the marginal extensions of the cast reach the desired relation to the edges of the flask. Smooth the investment material to a straight line from the flask to the outer and upper edge of the cast extension.

f-204. When the investment is hard, draw a line on it, parallel to and 2 mm. ■ distant from the peripheral margin of the trial denture. Sandarac the exposed plaster to assist in separation. Clean the rim of the flask thoroughly.

76. Invest Denture in Upper Section of Flask.

Clean the lower edge of the upper section of a flask, and see that it seats accurately on the lower section. Vaseline the rim of the lower section. Cleanse the exposed porcelain of the teeth with soap and

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water and a stiff brush. This removes grease and permits the teeth to be retained firmly in the investment when the flask is opened.

f-205. Take a small quantity of investing plaster and work it into the clearance depressions in the occlusal surfaces of the bicuspids and molars, also into the interproximal spaces. When the teeth are covered with plaster, spread a thin layer of it over the surface of the trial denture. Place the upper section of the flask firmly in position on the lower section, and fill it to the top with stiff investment mixture. Fill the indent in the lid of the flask and seat the lid on the upper section. No plaster should be allowed to escape between the upper and lower sections of the flask. Put a weight of about two pounds on the lid of the flask until the plaster is set. Retain a small portion of the last mix of investment as a check in setting, to tell when the flasks may be opened.

77. Open the Flasks and Remove All Wax.

When the investment is hard, warm the flasks in water heated to, and kept at, 120° F. for 15 to 20 minutes. If the cases have stood for several hours, the temperature of the water may be increased to 125° F. Open the flasks and pick out the wax. Cleanse the interior of the flasks with scalding water, in which has been dissolved a tablespoonful of carbonate of soda for each two quarts of water used.

Scrape a waste trough entirely around the cast parallel to the outline of the denture. The trough
f-206. must reach from the pencil line on the plaster to the edge of the flask, and be 1 mm. ▪ to 2 mm. ■ deep. In the tongue zone of the lower, the trough is

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made about 15 mm. wide. While the waste grooves are being scraped in the cast side of the flask, the tooth-carrying upper section of each is being warmed over a slow fire.

78. Pack the Rubber Into the Flasks.

Preparation: Cut and lay on a clean towel, or a large sheet of aluminum, 24 pieces of double thick pink rubber 2 mm. ■ wide by 10 mm. long. Cut strips of double thick pink rubber for the upper and lower, wide enough to reach from the diatoric holes or pins of the teeth to the upper margin of the bucco-labial flanges of the dentures, and long enough to reach from the second molar of one side to the same region of the other. Cut several long strips of base rubber 2 mm. ■ wide.

Procedure: When the upper section of the flask has been warmed until the teeth are too hot to touch, place this section of the flask on the bench. Twist up an old towel and wrap it around the outer surface of the flask to protect the hands while packing. Pick up the small strips of pink one at a time and attach one end of each strip in an interdental space, while the remaining part of the strip projects upward unattached between the teeth. Repeat this until strips of rubber are placed between adjacent teeth from the distal of the left first molar to the mesial of the right first molar.

f-207. The first strip placed, now thoroughly warmed, is bent forward and packed into the space above and around the collar of the molar, and attached to the end of the second strip. Each succeeding strip is treated in a similar manner until they have all been accounted for. Take narrow strips of base rubber and fill the diatoric holes of the posteriors, and also fill in below and above the pins of the anteriors.

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In packing rubber into the diatoric holes, use an instrument one-half the diameter of the hole in the
f-208. tooth, or less. Place the double thick pink facing strip in position, and add additional pink where necessary.

Fill the lingual of the lower or the palate of the upper with base rubber. The heels of the lower should not be packed full until after the first test. If the flask has become cold in packing, heat it again over a slow fire, to soften the rubber.

79. Test for Surplus or Deficiency of Rubber.

The right quantity of rubber is in the flask when the sections will come together and a small quantity of surplus rubber squeezes over into the waste trough. To create pressure in the flask when closed for the last time, two narrow pieces of rubber about 3 mm. ▬ wide, and 2 cm. long, are placed at the bottom of the ridge depression, one on each side, in the bicuspid molar area.

Procedure: Coat the cast and plaster surrounding it, with a good grade of liquid silex, or potassium silicate. Lay a piece of finely woven percaline, just large enough to cover the exposed rubber, over the rubber, and put the halves of the flask together after the silex is set. Place the flask in a press and apply pressure very slowly, until the sections come together, or until surplus prevents closing the flask further without applying extreme force. Open the flask and apply more rubber if needed, or remove some of the surplus rubber. Surplus rubber should be removed at the rear of the case.

When a test indicates the flask is filled, place a thin veneer of base rubber over the pink left exposed on the bucco-labial, then cut out a little surplus at the

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heel and close the flask again. After the first test, it is usually advisable to boil the flask ten to fifteen minutes before applying pressure to the flask in the press. Remove surplus rubber from the waste troughs and clean the plaster surface which separates the trough from the interior of the mould. Clean off all rubber adhering to the cast by swabbing with a cloth dampened with gasoline. Two or three strips of base rubber 3 mm. ▬ wide by 2½ cm. long should be placed in the ridge depressions usually near the heel, before closing the flask for the last time.

Paint the cast with silex, and immediately rinse off the surplus silex, until the finger rubbed over the cast detects a sleek, but not slippery feel to the surface of the cast. Close the flask before the silex dries. Put it in a press and boil under pressure until the upper and lower sections of the flask can be squeezed into contact. Place the flasks in a Donham Clamp, cast side up, and tighten the lock screw of the clamp.

Note: Some rubbers tend to resume their original form causing the flask to open if the flask is not transferred to the clamp as soon as removed from the press. If on opening the case the imprint of the weave of the percaline is apparent, this indicates that a sufficient quantity of rubber was not in the flask when finally closed.

80. Vulcanizing.

The best quality of dental vulcanite is produced when dentures are vulcanized at a temperature from twenty to fifty degrees lower than that usually indicated by manufacturers of dental rubber. When the thermometer registers 320° F., the tempera-

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ture inside the vulcanizer is actually about 340° F. In dentures vulcanized at low temperatures, porosity is an unknown defect and the odor, so commonly objected to in vulcanization, is eliminated. As the temperature of vulcanization is reduced, the time consumed in the process must be increased. Some brands of rubber require longer than others to cure properly at a given temperature.

Procedure: Place the flasks in a Donham Clamp with the lower or cast section up, insert a proper filler and tighten the clamp screw. Put half a glass of water in a steam-tight vulcanizer. Place the clamp containing the flasks in the vulcanizer, bottom up. Close the vulcanizer tight, light the burner and let the steam escape for two minutes. Set the Gas Temperature Regulator to hold the temperature at between 260° to 280° F., and maintain this temperature for about forty-five minutes. Set the regulator for a vulcanizing temperature of 305° F. and vulcanize an additional two and three quarters hours. This time may be increased one hour, without any obvious ill effect, if it is found that the time given does not vulcanize the pink veneer sufficiently. Permit the vulcanizer to slowly cool to room temperature before opening, for the best results. A longer time than that given at a lower temperature is not objectionable.

81. Remove the Dentures from the Flasks.

Note: If the vulcanizer must be cooled rapidly, through necessity, open the blow-off valve when the thermometer registers 230° F. to permit air to enter the vulcanizing chamber and prevent the formation of vacuum. The flasks must be cold before they are opened. Do not hammer the flasks to loosen the plaster, but cut the plaster away from the

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labial and heel of the denture until it is freed. A short blade plaster knife like the Buffalo Dental No. 5 is excellent for this purpose.

82. Prepare the Dentures for Polishing.

f-211. The contour of the gums before polishing must be very pronounced to allow for wear on high places in smoothing and polishing.

Procedure: Dispose of surplus material attached to the margins of the dentures using a file or vulcanite engine bur. Finish all margins to a blunt non-cutting curved or rounded form. With beveled chisels, trim off the surplus rubber at the gingival until the desired outline is obtained, and until the trimmed surface is at right angles to the surface of the tooth. Bevel and then round the inner and outer margins of the trimmed gingival margin. Develop detail, not worked out in waxing up on the buccal and labial surfaces of the denture, with the vulcanite bur and a No. 12 Rose Bur. With a very sharp beveled chisel, carve, develop, and smooth the contour of the lingual of the upper in-

f-212. cisors and cuspids where the full crown form of these teeth is to be imitated in rubber.

To dispose of excess rubber at the linguo-gingival margin of the lower and upper molars and bicuspids, use a beveled chisel, and cut away the rubber so as to form a slight shoulder at right angles to the crown of the tooth. With a large vulcanite bur, reduce the thickness of the shoulder to uniform width of a little less than 1 mm. ▪ and parallel to the mesio-distal curvature of the crowns. Sharp irregularities of the lingual of the upper and lower may be smoothed away with the vulcanite bur.

Note: Oval vulcanite burs are used.

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83. Polish the Dentures.

Procedure: Polish the most inaccessible places first. On the bucco-labial surfaces, polish the gingival margin festoons, and on the lingual polish the interdental spaces and any surfaces where an imitation of full tooth crown contour has been attempted, as for the upper incisors. A No. 3 single row stiff bristle brush and a fluid mixture of pumice with No. 100 grit emery may be used together for the preliminary smoothing.

When polishing the gingival festoons, hold the denture so that the brush revolves from the occlusal surface, or incisal edge of the tooth, toward the gingival. Some of the bristles should glance off the crown of the tooth into the groove between the tooth and the festoon to be polished, and the others should glance off the festoon. Work alternately from the mesial and from the distal surfaces of each tooth and make the bristles travel, as nearly as possible, in the direction parallel to the curvature of the festoon. Keep the denture always in motion to prevent wearing grooves.

The lingual of the lower denture and the deep palatal surface of the upper denture may be finished with a felt cone and the pumice emery mixture. All easily accessible, almost flat surfaces may be rapidly smoothed by using a 4 or 5 inch rag wheel with the pumice emery mixture.

Wash the denture and give it a final gloss on a 4 or 5 inch cotton flannel wheel lubricated by touching to it a cake of laundry soap or "Sure Shine." Deep palates may be polished with "Sure Shine" and a clean single row No. 3 stiff bristle brush.

The surfaces of the dentures that rest against the

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ridges and palate must be carefully inspected for protruding defects, and gone over thoroughly with a burnisher to remove all small prominences due to rubber working into minute holes in the casts. Any areas which have been given wrong shape by accidental marring of the casts must be relieved.

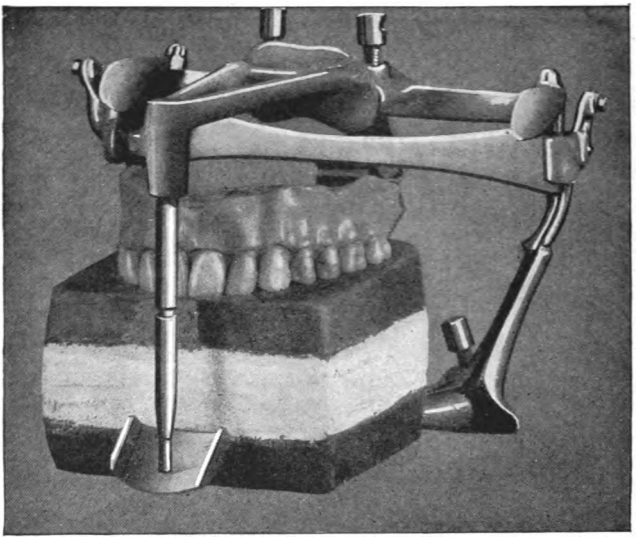

Fig. 21. Finished upper denture in position on the plasticine support for attaching to the upper bow.

84. Attach the Upper Denture to the Articulator for Regrinding.

Fill the ridge depression in the upper denture with plasticine, leaving the margins of the flanges exposed. Carefully seat the teeth of the upper denture in the imprints on the upper surface of the plasticine left attached to the articulator. Flow plaster into the denture, and over the upper bow of the articulator so that the imprint of the muscle trimmed edge of the flanges of the denture will be

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clearly registered in the plaster. When the plaster is set, open the articulator and remove the denture from its plaster seat, and clean it. The preparation up to this point is done in the laboratory.

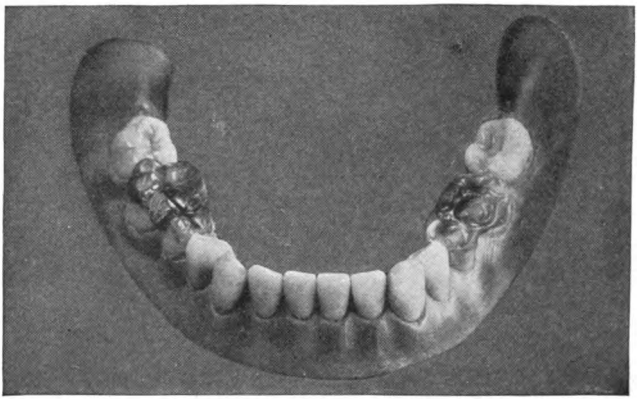

Fig. 22. Bite wax on the bicuspids and molars in preparation for remounting in the articulator.

85. Take a Wax Bite to Register Correct Relation of Lower to Upper Denture.

When the patient arrives, place the upper denture in the mouth. Melt soft wax into the occlusal depressions of the second lower biscuspids and first molars, and add to the wax until a layer about 2 mm. ■ thick has been formed on the bicuspid and molar. Seat the lower impression on the ridge and instruct the patient to close forcibly upon the soft wax, while the tip of the tongue touches the mid-heel of the upper, to insure the correct occlusion. Chill the wax, remove both dentures from the mouth.

86. Attach Lower Denture to the Articulator.

Attach the upper denture with hot wax to its seat on the plaster in the articulator. Fill the ridge

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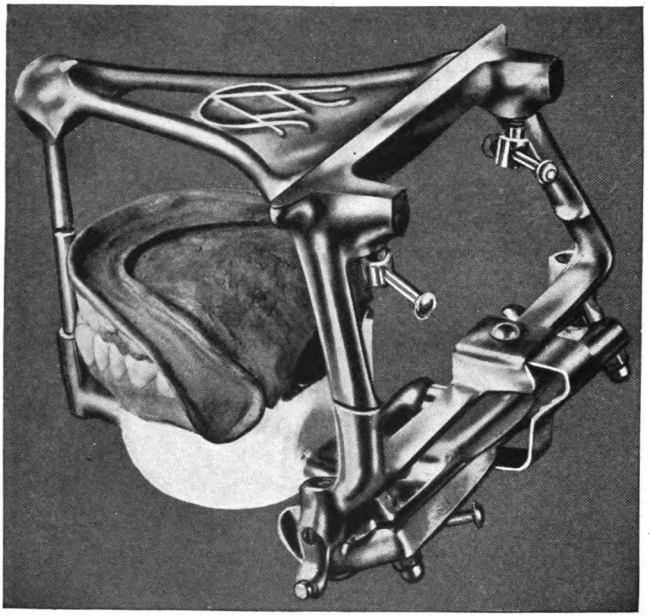

Fig. 23. Prepared lower denture in position for attaching to the articulator bow.

imprint in the lower denture with plasticine as for the upper, also fill the tongue space with plasticine. Turn the closed articulator upside down, and seat the lower denture in correct relation to the upper, being guided by the small wax bites. Plaster the lower denture to the lower bow. When the plaster is set, remove the wax from the lower teeth.

87. Grind the Dentures Into Articulation.

Take the incisor guide pin out of the upper bow and grind with a suitable stone to remove all noticeable incorrect contacts between upper and lower teeth for the working, balancing, and incising bite positions. Relieve the upper and the lower anterior teeth, so that they will remain slightly separated in

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all articulating relations. This is advisable to avoid chipping the porcelain later when grinding. Apply a thick mixture of carborundum and glycerine to the occlusal surfaces of the lower bicuspids and molars, and to the linguo-incisal surfaces of the upper incisors and cuspids. Grind the teeth in the
s-72. same manner as advised for the waxed up case, until the lower denture glides smoothly upon the upper in masticating and incising movements.

88. Relieve Incisors for Mouth Grinding.

Place the dentures in the mouth and examine the contacts in the incising bite position. If necessary to shorten the lower incisors to permit the upper and lower posterior teeth to come into contact simultaneously with the anteriors, do so by grinding them with an engine stone, so placed that the inclined plane produced will be formed on the lingual of these teeth. Inspect the dentures in right and left lateral occlusion, and if the lower cuspid touches the upper lateral, relieve the mesial corner of the lower cuspid or the distal facet of the lateral.

It is preferable to have the upper and the lower incisors a little too short to touch in the protrusive bite when grinding commences, as they will then come into contact as the grinding of the posterior teeth proceeds, and the danger of chipping them will be avoided.

89. Grind to Adjust Balancing Bite Cusp Inclines to Natural Mandibular Movement.

If the upper denture moves on the mucosa when the patient simulates chewing, this movement may be eliminated in the following manner. Place vaseline on the occlusal surfaces of the lower bicuspids

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and molars of the right side. Then apply a mixture of white vaseline and carborundum to the occlusal surfaces of the molars, bicuspids, and to the cutting edges of upper and lower incisors and cuspids of the left side, and have the patient "chew" on the right side. Support the upper denture to keep it from rotating, and have the patient chew on the vaseline coated teeth of the right side, until all tendency of the upper to rotate disappears. Cleanse the denture and have the patient chew on the left side, reversing the application of clean vaseline and grinding mixture in the foregoing procedure.

To grind for the incising movement, apply the grinding mixture to the lingual surface and cutting edges of the upper anterior teeth, and to the occlusal surface of the posterior lower teeth of both right and left sides, then have the patient wear the teeth into a smooth working relation for the forward, backward, or incising bite movement.

When the teeth are ground into the incising bite, place fresh carborundum on all contact surfaces and instruct the patient to chew in any way that seems natural, repeating any action selected six times or until any bumps that may be felt are reduced. Round off sharp margins, produced by grinding, with a fine sandpaper disk in an engine mandrel.

NOTE: Do not under-estimate the importance of grinding the dentures to a smooth working incising bite relation, also to intermediate positions between working and incising bites. The value of the dentures may depend on this.

The dentures are now finished. If rebasing is necessary, it is best to defer this operation until the dentures are worn for a week or ten days. In this time the dentures will settle slightly.

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90. Relieve for Areas Showing Irritation.

Instruct the patient to return for an examination of the mouth on the second day following the insertion of the dentures. At this time parts of the dentures that press too heavily upon the oral tissues may be relieved, and the patient may be instructed how to overcome difficulties with which he has met in his brief attempt at using artificial dentures.

If future visits are made necessary by irritation of the oral tissues by the dentures, inform the patient that the dentures should not be removed from the mouth except for cleansing after the irritation is noticed, until the adjustment has been effected. This is important if the location of the irritated zone is to be easily found.

To indicate on the denture the position of areas requiring relief, indelible pencil dots may be made on the mucosa at the anterior and posterior ends of the irritated area. These dots may be transferred to the dry denture by inserting it in the mouth and seating it on the ridge, holding it in this position for a few seconds.

When the irritated areas are located under the denture, cut away the surface of the denture enough to relieve the heavy pressure. If the irritated zone is at the border of the flange of the denture, shorten the flange. Do not forget that all margins of the denture should be at least 1 mm. thick and rounded or cylindrical.

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91. Instructions to Denture Patients.

Before dismissing denture patients it is well to place before them the possible difficulty and discouragements that may be met with in the early stages of learning to wear dentures. When speaking to patients about the use of dentures in mastication and speech, it is best to make all statements in an ultra-conservative tone, so that the patient may not be led to expect the impossible.

Patients should be informed that a variable period of time must elapse before the muscles of the oral cavity can become adapted to the form of the dentures. During this time of adjustment more or less difficulty will be experienced both in mastication and in speech. The length of the period of adjustment will vary approximately from two weeks to three months. The period will be longer for self-conscious persons than for others, and will also depend upon the ease with which a patient finds it possible to adapt himself to new circumstances.

In speaking of the soreness which may possibly follow the insertion of the dentures, it is better to overestimate this. The mental attitude of the patient is more easily adjustable to a situation in which expected pain or trouble does not materiali
than to one of the reverse kind.

When it is known that the shape or relation of the ridges may prevent efficient mastication on one side of the mouth, the patient may be forewarned of this, to prevent the necessity for explanations after the patient has become convinced that something is wrong with the dentures and makes a complaint.

Artificial dentures should be cleansed thoroughly after each meal. A stiff brush used in combination

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with bicarbonate of soda or some mild abrasive and soap may be used for this purpose.

Artificial dentures should be worn continuously, day and night for from ten days to one month, or for as long a period after they are delivered to the patient as is necessary to permit the tissues of the mouth to become habituated to their presence. When this period of adjustment is ended, the dentures should always be removed from the mouth over night and kept in a mild antiseptic solution. It has been noted that patients following this plan require new dentures less frequently than others, and the tone of the oral mucosa seems to be better. It is assumed that this condition is due to the fact that the tissues have a chance, while the dentures are out, to regain their tone and throw off any toxic materials that may have accumulated in them under the denture.

The position of the tongue in masticating plays an important part in the success of the lower denture. The dorsal surface of the tongue should be kept level with or slightly above the occlusal surfaces of the lower molars and bicuspids. The tip of the tongue should be kept in contact with, or in the region of the linguo-incisal surfaces of the upper anteriors. The lower denture may often be easily displaced when the tip of the tongue is allowed to travel around the margin of the base of the lower denture. When the dorsal surface of the tongue is kept at the level just described during the period of mastication, food is prevented from working between the tongue and the denture, and this obviates the chance of displacement of the denture by the tongue in attempts to carry the food back onto occlusal surfaces of the teeth.

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In the first attempts to masticate, food should be taken into the mouth in very small portions and slowly masticated. When the patient has become so well accustomed to the dentures as to be unconscious of their presence, a food bolus of normal size may be easily masticated. In drinking, the tongue should be brought into contact with the inner surface of the upper margin of the lower lip, to prevent the fluid from penetrating between the labial surfaces of the lower incisors and the lip.

When patients have habitually masticated for some time on a few lower anterior teeth they should be warned that this is an abnormal habit, that success in wearing dentures and the permanence of their adaptation may depend a great deal on whether a normal habit of chewing on the molars and bicuspids can be re-formed. Artificial dentures usually function most satisfactorily when mastication is confined to the second bicuspid first molar zone.

Biting the cheek may occur when the second molars are set too far to the buccal or when the bite is not opened sufficiently. It may be relieved by forming a modeling compound extension on the buccal surface of the molars and bicuspids. This extension may be 2 to 3 mm. ■ wide, and should terminate at the level of the cusp tips of the upper teeth. This extension is gradually scraped away until in a few weeks it is entirely removed when the difficulty will have disappeared. A second method sometimes used is to grind away the buccal margin of the occlusal surface of the lower second molar. This allows the buccal surface of the upper molar to project over the buccal of the lower enough to hold the soft cheek tissue away from the molar when biting contact is effected.

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92. Prepare for Full Rebasing Technic.

Remove all projections on the under, or ridge, side of the lower denture until it presents smooth, flat, inclined sides sloping like a "V."

Note: Two methods of rebasing are employed. The first is used where the ridge is of average shape and for patients who give the correct "bite" readily, and is called the "full rebasing technic." The second is best for high narrow ridges and for patients who do not give the correct "bite" easily, and is called the "sectional technic for rebasing." It is described in the appendix.

93. Prepare the Full Rebase Blank.

Fill a porcelain wash basin with water heated to 118° F. Immerse a plaster cast made to fit the denture and a sheet of wafer compound in the water. Adapt the wafer of compound to the cast while both are immersed in the water. Trim away most of the surplus from the adapted wafer until it is just a little larger in area than the imprint made on the cast by the base of the denture.

Place the shaped wafer against the denture and immerse both under the warm water. Take a folded
f-214. cotton napkin or a cotton roll and adapt the approximately shaped wafer to the ridge surface of the denture. Trim off the marginal surplus. Place the denture in a dish of ice-water and remove the rebase blank from it. Dry the denture and the blank with compressed air or cotton napkins. Seat the dry blank in the dry denture.

Note: A celluloid lower cast, such as is furnished for use with the Gysi Simplex for technic work, makes a good substitute for the plaster cast.

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94. Attach the Rebase Blank to the Denture.

Heat the broad end of a No. 7 spatula until it generates smoke when touched to wax. Hold the spatula so that two-thirds of the length of it is above the thumb and finger, and let the weight of the spatula carry it against the compound, where it laps the vulcanite. When the compound melts and fuses to the denture, shift the spatula slowly forward. Follow this technic until the periphery of the compound wafer is fused to the denture. Rough edges should be smoothed away with a sharp knife.

95. Practice Act of Taking Rebase Impression.

Use the lower denture with rebase blank attached, but do not heat the blank. The lower denture must be held in perfect occlusion with the upper while
f-215. the patient bites the lower ridge into the compound.
s-96. When the sequence of motions is learned, lubricate the back of the first joint of the index finger with cocoa butter to prevent the blank from sticking to the finger after the blank is heated. Be sure that the patient knows how to place the tip of the tongue against the mid-heel of the upper denture, and keep it there while closing.

96. Take the Primary Rebase Impression.

Warm the rebase blank uniformly for about six seconds with a stream of water heated to 160° F. Place, and hold the lower denture in occlusion against the upper, in the mouth. Deflect the lower lip, so that the supporting thumb and finger are inside of the mouth, and have the patient close, with the tip of the tongue touching the mid-heel of the

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d. upper denture, and "exhaust the air" from the oral cavity, as for taking the lower impression. Chill the impression in position. Take the lower denture out of the mouth, chill and replace it in the mouth, and inspect the articulation to determine if the bite relation is correct. The relation of the upper and lower cuspids and bicuspids should be the same as when the dentures are held in occlusion in the hands. If the bite is wrong, reheat the compound base and repeat the actions described in the preceding lines.

97. Take the Secondary Rebase Impression.

The secondary rebase impression is made with the lower denture resting on the lower ridge, when the bite is correct but stability is not good. Heat the rebase blank with hot water, place the denture upon the lower ridge, and have the patient close while holding the tip of the tongue against the mid-heel of the upper denture. Press downward and backward on the flanges of the lower denture in the second molar region to assist the patient in biting it into place. Remove the fingers and direct the patient to exhaust the air from the mouth while simultaneously contracting the cheek muscles. Chill the impression in the mouth. Remove the lower denture

d. and employ the tracing stick mouth blowpipe technic to build up the zones of the impression wherever thick masses of rubber were removed to prepare the denture for rebasing.

Test the rebased denture for stability and retention. If unsatisfactory, locate and correct errors and trim the margins in the same manner as for the lower impression.

Note: See appendix for sectional rebase technic for lower and rebasing of uppers.

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98. Prepare Rebased Denture for Flasking.

Remove surplus compound that is attached to or laps over upon the bucco-labial or the lingual flanges of the denture. Fill small defects in the surface of the impression or open places between the rebase compound and the vulcanite, by working soft black carding wax into them with a warm (not hot) spatula.

Note: Heating for the secondary rebase impression may be done with the mouth blowpipe directed against the middle surface of the impression.

99. Flask the Rebased Lower Denture.

Fill the lower section of a No. 22 C., B. D. M. Co. flask with a stiff mixture of equal parts of Spence plaster and plaster of Paris. Work some of this mixture into the occlusal fossae of the teeth and into the interdental spaces between them. Imbed the denture, teeth down, in the investment so that the margins of the molar bicuspid sections of the buccal flanges of the denture are on a line with the margins of the flask opposite them. The investment filling the tongue space should extend in a direct, or slightly convex, line from the right to the left lingual flange. The investment should come to within 1 mm. ▪ of being even with the margins of the denture flanges.

Trim the investment smooth and sandarac it and the impression. Attach a strip of wax to the plaster, allowing a space of 3 mm. ▬ between the strip and the flanges of the denture all around. This strip will form a waste trough in the upper section of the investment. If the shape of the heel of the denture, together with the size, combine to make a steep incline from the inner edge of the flask rim

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down to the rear margin of the denture, strips of wax may be applied to the inclined surface at intervals of 2 mm. ■, in order to facilitate drawing these areas apart in opening the flask. These strips should lie between the edge of the flask and the wax strip, just added, and at right angles to the wax strip.

Clean the rims of both sections of the flask, vaseline the lower rim of the upper section, and seat it on the lower section. Fill the flask carefully with a stiff mixture of Spence and plaster of Paris from which all bubbles have been jarred. Be careful to prevent the flask sections from becoming separated enough to allow plaster to penetrate between them. Place the lid on the flask and place a weight on the lid. Save a lump of the plaster as a check to determine when the flask may be opened.

100. Open Flask, Freshen Vulcanite, and Pack.

To prepare the flask for opening, heat for fifteen to twenty-five minutes in water maintained at 125° F. Open the flask cautiously. Pick out all compound, remove the wax from the waste groove, and freshen the vulcanite with a vulcanite bur. Cut away enough vulcanite at all points so that the new rubber may have a minimum thickness of 1 mm. ▪ Retention of the rebase vulcanite may be assisted by cutting grooves in the vulcanite, with a large wheel bur.

Heat the section of the flask containing the denture, over a slow flame, until the vulcanite is hot. Pack the case by laying long narrow strips of base rubber edge to edge on the vulcanite, until it is covered. Do not place rubber in the heel of the case until the

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first test for quantity is made. Silex the cast. Place two pieces of percaline, one on the right, and one on the left side of the flask, covering the rubber. Close the flask in a press, test, and adjust the amount of rubber until the mould is full. Use a cloth moistened with gasoline to remove base rubber adhering to the cast. Remove all surplus rubber adhering to the plaster rim between the inner edge of the waste trough and the flange of the denture.

Place strips of rubber 3 cm. long by 2 mm. ■ wide in the trough of the molar bicuspid region of the denture to insure a slight surplus. Silex the cast, wash surplus silex away, close the flask, and boil under pressure until the sections come together.

101. Vulcanize the Rebased Denture.

s-80. Vulcanize as for a full case, or for one and one half hours at 315° F., running the temperature slowly up to this point.

102. Establish Uniform Biting Pressure for the Rebased Denture.

Uniformity of biting pressure may be assured by regrinding the rebased dentures in the articulator. The comfort and permanence of fit depend on balanced biting pressure in all positions in which the teeth may be brought into contact.

Many upper dentures that are either uncomfortable or that will not remain seated, during speech or mastication, are caused to be thus because the dentist who made them did not appreciate the value of an accurate occlusion and hence neglected to regrind the cases in the articulator to a corrected bite after vulcanizing.

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Appendix Containing Definitions, Special Technic, Carding Charts and Technic Steps

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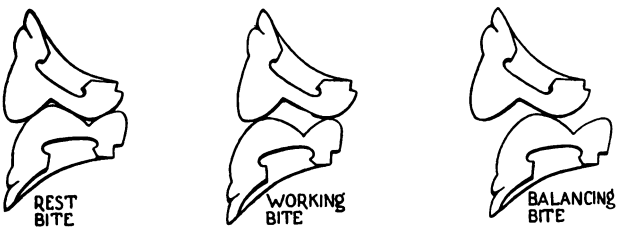
Adaptation. An intimate contact of the impression material with that part of the mouth which the denture should touch, obtained without displacing soft tissue in a lateral direction.

Adjustment Blocks. Small compound impressions taken in the tuberosity region of the upper tray, and used to test the relation of the posterior part of the tray to the tuberosities.

Articulation. A term in Prosthetic Dentistry which refers to the art of arranging opposing porcelain teeth of full dentures so that they will permit full freedom of habitual mandibular movement in mastication and in speech action, and so that both dentures may exert uniform pressure on the ridges supporting them in whatever position the two sets of teeth may be brought into opposition, that is, in the Balancing, Incising, Rest, and Working Bites, or any intermediate position.



Cross section of upper and lower molars, showing 3 bite relations.

The Rest Bite, or central occlusion, is demonstrated when the upper set of teeth is in contact with the lower set with the mandible in the "rest" or retruded position, and so that the median line of the upper coincides with the median line of the lower. In this position the inclined planes of the lingual cusps of the upper molars and bicuspids should be in contact with the inclined planes of the buccal cusps of the lower molars and bicuspids on both sides of the dentition.

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THE WORKING BITE is demonstrated when the mandible is moved to one side so that the buccal cusps of the lower molars and bicuspids of that side come into contact with the buccal cusps of the opposing upper molars and bicuspids. The lingual cusps of the opposing molars and second bicuspids should also be in contact. The amount of lateral movement involved, in the incisor region, is equal to half the width of a lower central incisor. When the right side is in the working bite relation, the left side assumes the balancing bite relation and vice versa.

THE BALANCING BITE is demonstrated when the buccal cusps of the lower molar and bicuspids of one side come into contact with the lingual cusps of the upper molars and bicuspids of the same side. In the incisor region, the lateral movement involved equals half the width of a lower central incisor.

THE INCISING BITE is demonstrated when the mandible is thrust forward far enough to cause the lower incisors to come end on against the upper incisors. At the same time the upper cuspids should touch the lower first bicuspid and two or more points of contact should be made distal to this on either side.

Balancing Bite. See Articulation.

Note: The proposition of eliminating the word "bite" from the vocabulary of dental prosthetics is being considered by the Committee on Nomenclature of the National Society of Denture Prosthetists. It has been suggested that the word "occlusion" be substituted where possible for the word "bite" where it has been customary to use it in the past.

Base. That part of the denture, or bite-plate, which covers the maxillary-palatal or mandibular tissues of the mouth.

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Base Impression. An impression of either the maxillary palatal or mandibular areas of the mouth, before the length of the heels, the height, and the adaptation of the flanges have been finally established.

Base Plate Composition. (Trubase). A material of wafer thickness (1½ mm. ■) compounded of shellac and other ingredients, which softens easily but is hard enough at mouth temperature to keep its shape during bite taking and trying in the trial dentures.

Bending Stage. See Compound—Working Stages.

Bite Plate. A base of Trubase, composition material, or metal, accurately adapted to a cast and having a bite rim attached to it.

Bite Rim. A rim of compound, or wax, attached to a base. It takes the place of teeth while the dentist is planning the shape and position of the dental arch.

Bite Support. A lower tray bearing on its upper surface a bite rim adapted to the upper bite rim under biting pressure, and on its under side three small bearing surfaces of compound that fit the lower ridge. It is used to support the upper impression during muscle trimming and to assist in making the lower impression.

Chill. Any means used to cool the warm impression material to a stone hard consistency, either in the mouth or out of it. Chilling in the mouth is accomplished with compressed air, cotton rolls, or napkins saturated with ice-water.

Chilling out of the mouth is accomplished by immersing the impression in ice-water.

Chilling with the mouth closed is effected by injecting ice-water into the mouth while the mandible presses the lower bite rim against the upper bite rim. The lips are

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kept closed around the tube of the water syringe, to prevent the escape of the water. When the water becomes warm, the patient is directed to part the lips and expel it into a dish held under the chin. Applications of cold water are repeated until the compound is hard.

Classification by Ridge Relation. Edentulous mouths may be divided into three groups, each differing from the others in the relation of the lower ridge to the upper ridge in the rest bite relation. This difference in relation, especially of the anterior part of the ridges, affects the arrangement of the anterior lower teeth. In all classes the upper anterior teeth should be placed where esthetics requires.

Class I, or Normal Type, includes all cases in which in the rest bite relation the middle of the lower ridge is directly below or slightly to the lingual of the middle of the upper ridge.

The technic for this class is described in the preceding pages.

Class II, or Posterior Relation Type, includes all cases in which, during the rest bite relation, the middle of the lower ridge or the anterior third of the lower ridge is more than 3½ mm. ▬ to the lingual of the middle of the opposing area of the upper ridge.

In this class slight surgical reduction of the upper ridge and the anterior part of the lower is often indicated.

In articulating teeth for this class, the lower teeth are set above the middle of the lower ridge as in the normal type. The upper teeth must often be set directly below or toward the lingual of the upper ridge, and the posteriors must often be ground very thin. When the variation in incisor ridge relation is extreme, it is often necessary to let the upper incisors drop below the level of the

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plane of occlusion so that the lower incisors, which then need not be set so high, will not be too conspicuous.

The lower molars and bicuspids are articulated as described for the normal type, but they may be set slightly to the buccal of the middle of the lower ridge, though not enough to allow the buccal surface of any molar or bicuspid to project buccally beyond a vertical line tangent to the buccal margin of the ridge.

The greater size of the upper incisor cuspid zone of the arch requires that the lateral width of the six or eight anterior lower teeth be reduced to permit their being placed above the middle of the lower ridge. The space for the six lower anteriors may be created in moderate cases by grinding the distal sides of the lower cuspids, and the mesial surfaces of the lower first bicuspids as well as by setting the lower incisors and cuspids in irregular rotated positions. In more extreme cases, space may be created by omitting a lower central incisor or by choosing lower six anteriors as many millimeters narrower than those regularly furnished with the upper teeth being used, as the size of the lower arch requires.

In extreme cases, the first lower bicuspids may be removed and the cuspids set in their place.

In this class, the anterior lower teeth will not touch the uppers except in the incising bite and in the extreme working bite movements.

Class III, or Anterior Relation Type, includes all cases in which in the rest bite relation the middle of the lower ridge is placed to the buccal or labial of the middle of the upper ridge.

The posterior lower teeth as a rule may be set to the normal antero-posterior and lateral relation in articulation, but in extreme cases, it may be necessary to cross the bite of the first and second molars and sometimes also of the

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bicuspids. This, however, is but rarely necessary, as the upper incisors, cuspids, molars, and bicuspids may, when necessary, be set well to the labial or buccal of the upper ridge without interfering with the masticating efficiency that may be developed in this class. The lower molars should not be set to the lingual of a vertical line tangent to the inner margin of the lower ridge.

When it can be done with the patient's consent, the upper anteriors may be set slightly anterior to the probable position assumed by the natural teeth and the lower anteriors set toward the lingual border of the lower ridge so that a normal lip profile may be established.

When it is desired to imitate the position assumed by the natural teeth, the lateral width of the lower anteriors must be increased or the material in the upper six anteriors decreased, so as to allow the lower anteriors to set outside of the upper anteriors.

For moderate cases, lower incisors slightly larger than those carded with the upper sixes may be selected.

For extreme cases, the first upper bicuspids may be omitted and the upper cuspid set into the position of the first bicuspid.

Classification by Tissue Condition. Edentulous mouths may be separated into four groups differentiated one from another chiefly by the difference in depth and character of the muco-periosteum that covers the maxillary-palatal or mandibular surfaces of the mouth upon which a denture should rest. The following classification of mouths and impression technic is abbreviated and is for the upper mouth. The complete classification of Supplee may be found in the first volume of "Professional Denture Service."

Class I. The ridges and posterior part of the palate are covered by mucosa of uniform depth of such thickness

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that it will yield slightly to finger pressure. There is an ample area of inactive soft tissue for post damming, located behind the posterior palatine foramina. It is possible to easily determine the location for the bucco-labial margins of the denture.

IMPRESSION TECHNIC. Compound with plaster—or plaster with close fitting tray. Location of margins of impression should be the same as for compound technic.

CLASS II. The ridges and posterior part of the palate are covered by a thin layer of dense mucosa which does not appear to yield to the touch. The area of inactive soft tissue located behind the posterior palatine foramina is very narrow from front to back. It is necessary to be very accurate in locating the heel of the impression. Movable connective tissue, which may be attached at any point between the crest of the ridge and the muscle attachment, underlies the bucco-labial mucosa. This peculiar condition renders obscure the proper location for the bucco-labial margins of the denture.

IMPRESSION TECHNIC. Compound correctible impression preferred—compound with plaster.

CLASS III. The ridges and posterior part of the palate may be covered by a layer of thick mucosa of irregular depth, and somewhat spongy in character. This soft tissue yields to slight pressure, moving in the direction of the force applied. The quantity of soft tissue posterior to the palatine foramina is sufficient to allow some latitude in locating the heel of the impression. Movable connective tissue may be attached to the bucco-labial surface of the ridge at any point between the crest of the ridge and the point of muscle attachment. A layer of fleshy or fatty tissue is present beneath the movable connective tissue areas.

IMPRESSION TECHNIC. Compound technic as outlined in preceding pages.

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CLASS IV. The ridge in this class is characterized by the presence of a soft flabby pendulous flap of tissue attached to the incisor cuspid region, and sometimes also by soft movable tuberosities. The posterior third of the palate is usually covered with soft yielding tissue, more or less spongy in character. The palate may or may not be hard. The character of the tissue overlying the bucco-labial surface of the ridges is variable in this type.

IMPRESSION TECHNIC. The technic for this type of mouth is almost the same as for the other types, up to and including the making of the base impression, and the lower bite support. The labial flange of the upper tray should be trimmed away more than for Class I, II, or III cases, and no effort need be made to secure a good labial flange for the base impression.

PROCEDURE: Cut away all of the labial flange of the base impression, in such a manner as to expose the full length of the labial surface of the soft ridge area.

Soften the occlusal surface of the bite rim of the upper impression, temper this, and have the patient close in the correct bite relation, forcing the lower rim against the soft surface of the upper, to equalize the biting pressure. Remove the upper impression, chill, and trim away surplus material from the lingual and labial margins of the bite rim.

Scrape the surface of the impression that supports the lingual surface of the soft ridge, so that when the impression is in place and the soft ridge is in normal position, a space of about 1 to 2 mm. ■ will be apparent between the lingual surface of the ridge and the scraped portion of the impression.

Heat the scraped area of the impression and a narrow zone of the adjacent unscraped impression surface, until the compound is soft to a depth of about 2 mm. ■ .

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Seat the impression. Have the patient close until the lower bite support is in contact with the upper in central occlusion relation. Apply the index finger, horizontally, to the upper lip and gently press the lip inward and downward against the soft ridge. This will force the soft ridge downward and backward into the soft compound. The ridge should be displaced to a vertical position, or slightly to the distal of vertical. Repeat the operation until this is accomplished. Chill the impression in position.

Remove the impression. Chill. Trim the edge of the impression to right angles with the imprint of the ridge. Cut several small notches or grooves in the trimmed edge. Place the impression in the mouth, and have the patient close to support it with the lower, in central occlusion. Place a small roll of soft compound under the upper lip. Place the index finger against the lip, in a horizontal position, and gently conform the soft compound to the soft ridge, and the hard area above the soft ridge. Chill in position. Remove the impression and the labial piece just formed. Dry the labial piece and the base impression and attach the labial piece to the impression with a hot spatula.

Replace the impression in the mouth and see that the labial flange is extended sufficiently to fit into the pocket formed by the lip and the ridge.

Relieve the posterior palatine foramina areas of the upper impression, and also the hard median tissue zone. If the upper vault is very flat, only a slight amount of relief will be required for the portion of the impression that covers the hard median tissue.

"Suction trim" and "Muscle trim" the impression as for the regular technic. Post dam the impression as for the regular technic.

Proceed as usual with the lower impression, following the technic given for average cases, with the difference that

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when the ridges are soft and flabby, or when the lower ridge is high and thin, it is customary to relieve the impression where the impression fits upon the surfaces having the character mentioned. The relieving may be done with a large round bur in the engine with the impression immersed in ice-water to prevent the compound from clogging the bur, due to the friction of cutting. For flat flabby areas surmounting the sharp thin ridge, the relief laterally should be approximately 1 mm. ▪ in depth.

The object of this technic is to deflect the soft upper ridge slightly toward the palate. When the ridge is so deflected, the labial flange of the impression may fit against the hard area of the ridge situated above the soft tissue. It is not desirable to compress the soft flabby ridge, but it is desirable to have it deflected in the manner indicated.

Compound—Working Stages.

Bending Stage. A condition allied to the Stay Put, but slightly softer. In this condition the impression flanges of compound may be bent into adaptation, without changing their shape.

Flowing Stage. A condition of compound in which it is just hot enough to flow. In this condition it appears glossy or glazed, and will receive an imprint of the finest detail, when a thin layer of it is supported by compound of moulding consistency, or a metal tray.

Moulding Stage. A condition of compound in which it may be moulded into any form desired. In this condition, it is not sticky to moist fingers, will not take an impression yielding fine detail, and will retain its shape fairly well under the pull of gravity.

Stay Put Stage. A condition of compound in which it is so nearly set that its form cannot be changed by the elastic rebound of tissue that may properly be compressed, although it may be bent by finger pressure into a compression adaptation to such tissue.

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Correcting the Bite. When the trial dentures are set to an incorrect bite, it is not necessary to remove both casts from the articulator to make a correction. This can be corrected by changing the position of the lower cast in the articulator.

When it is evident at the time of the try-in, that the bite relation is incorrect, a correction may be made as follows:

Remove the bicuspids and molars from the lower trial plate and substitute for them a mass of soft wax, slightly larger in bulk than the teeth themselves. With the upper or maxillary denture in position, seat the lower or mandibular denture on the ridge, and hold it carefully in place while the patient raises the tongue into contact with the mid-heel of the maxillary trial denture, and closes, until the anterior teeth of the mandibular denture come to the desired relation to the anterior teeth of the maxillary denture. Have the patient open the mouth and close several times to verify the relation of the upper teeth to the imprints made by them in the soft wax. Instruct the patient to protrude and retrude the mandible several times while the mandibular denture is supported in position on the ridge. At the end of one of the retrusive movements, instruct the patient to close quickly. If the teeth of the upper denture seat squarely in the imprints in the wax on the lower, it is reasonable to assume that the bite is correct.

Remove the lower cast from the lower bow of the articulator. Attach the upper trial denture to the upper cast. Seat the upper teeth in the imprints made in the wax attached to the lower trial denture, and turn the articulator upside down. Place the lower cast in the lower trial denture. Set the incisor guide pin and attach the lower cast to the lower bow of the articulator with plaster.

When the plaster is set, remove the wax pieces and reset the lower bicuspids and molars to the uppers. This will

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be relatively easy to do inasmuch as the upper teeth were not disturbed in the process of remounting the lower cast.

Exhaust the Air. A term used to indicate the act of removing the air from the oral cavity to trim or assist in adapting impression material to a part of the upper or to the lower ridge. It is effected by an action of the tongue similar to that of swallowing, continued until pressure is exerted within the oral cavity.

Extension. A term used to indicate the extent of the area covered by the base, or bearing surface, of an impression or denture. When the base of the impression extends to, but not onto, active muscle tissue, it is said to be properly extended. If, in seating the impression on the ridge, the flange displaces muscle tissue in the direction opposite to the pull of the muscle, the flange is over-extended.

Under-extension usually results in an unstable denture and poor retention. It may often be detected by passing the index finger horizontally along the margin of the impression. If hard ridge surface can be felt beyond the impression flange, the flange is under-extended.

Flange. That part of an impression that fits against the side of a ridge. The edge of a flange should be at, or near, the location of muscle attachments.

Flowing Stage. See Compound—Working Stages.

Glaze. The act of heating the surface of impression compound until it is glossy. This is done with a mouth blowpipe flame directed against the compound. The flame is kept moving to prevent over-heating. The glazing is finished when the surface is smooth and glossy.

Large areas, like the surface of an impression mass, are glazed with a yellowish tipped large flame.

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Small additions to an impression, made to correct defects, are glazed with a long thin blue flame to prevent absorption of the heat into areas not to be corrected.

Guide Rim. A small mass of compound attached to a short section of the rim of the lower tray, at either heel, or in the incisor region, and bearing an imprint of the lower ridge. Guide rims are used to guide the tray to position on the ridge, and to support it there.

Impression Mass. A correct quantity of impression compound attached to a tray and shaped into a form suitable for taking an impression.

Incising Bite. See Articulation.

Incorrect Bite. See Correcting the Bite.

Mid-heel. Used to indicate the middle of the distal edge of a denture or impression.

Moulding Stage. See Compound—Working Stages.

Mounting Used Dentures in the Articulator. See Remounting Dentures, etc.

Occlusal Plane Straight Edge. A nickel-plated straight edge about 15 cm. long, 3 cm. wide and a little more than 1 mm. ▪ thick. It is used to test the inclination of the occlusal plane of the upper bite rim.

Post Dam. A phrase used to indicate any means of creating extra pressure on the soft inactive tissue covered by the posterior margin of an upper or lower denture, for the purpose of excluding the air.

Post Dam Zone. See Posterior Pressure Zone.

Posterior Pressure Zone. (Post dam zone.) An area of inactive soft tissue that extends across the posterior end of the palate and the posterior ends of the lower ridges.

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The zone for the upper denture is bounded anteriorly by the posterior termination of the hard areas of the median part of the palate and of the tuberosities, also by the posterior margins of the orifices of the posterior palatine foramina. The posterior boundary of the zone is determined by a line that crosses the soft palate at the point where muscle activity is evident when the patient says "Ah."

The zone for the lower denture is bounded anteriorly by the posterior termination of the hard area of the lower ridge. The posterior boundary of the zone is formed by the muscle attachments at the posterior end of the lower ridge.

Protrusive Lower Ridge. See Classification by Ridge Relation.

Rebasing Lower Dentures, Sectional Technic. See Sectional Rebasing Technic.

Rebasing or Refitting Upper Dentures. A sectional rebase technic, similar to that outlined for the lower impression, may be applied to the upper denture when adaptation to the mouth is imperfect, either because of not being able to secure a good retention for the impression, or because of loss of retention due to changes in the mouth.

If the upper denture seats on the upper ridge, in correct relation for articulation and expression, when pressure is applied to the center of the linguo-palatal surface of the denture, no preliminary preparation of the central part of the palate is necessary. If the denture is so badly out of fit that it does not seat on the palate in correct relation for articulation and expression, it is first necessary to get the relation of the denture correct by means of a small impression of the central part of the palate. If only a small addition of compound is needed to seat the upper correctly,

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trim away part of the rubber on the palate of the denture,
d. and trace modeling compound onto this area. Temper and place the denture in the mouth while the compound is soft. Seat the denture in approximately the position desired, and have the patient close the lower on the upper in a correct bite relation. Be careful to have the upper teeth articulate correctly with the lowers. If the seat of compound just applied to the center is not compressed sufficiently on the first trial, it may be heated with a mouth blowpipe, and the operation of placing in the mouth repeated. When the relation of the upper denture to the lower and to the upper lip is satisfactory, the denture is ready for rebasing. The molar bicuspid areas of both sides should be prepared for rebasing first, then the labial, and finally the area extending from tuberosity to tuberosity across the heel. From buccal or labial to lingual, the area prepared should extend from the crest of the flange on the outside up to the relief zone in the center of the palate.

Prepare the denture for rebasing by cutting away all areas that fit into undercuts so that a cast poured into the trimmed denture might be withdrawn from it in a vertical direction. If it was not necessary to compensate for settling by using a thick compound addition, it will be necessary to remove vulcanite from the untrimmed areas of the ridge and palate surface of the denture to a depth of 1 mm. ▪ , or as near this depth as the thickness of the denture will permit, to accommodate the added compound and allow it to mould properly. Place the lower denture in the mouth, add compound to the right and left molar bicuspid zones of the denture, temper, partly seat the upper denture, have the patient close in the correct bite relation, and guide the upper into occlusion. This will partially displace the compound tracing. Trim away surplus compound that has escaped out of the prepared area onto the unprepared surface of the denture, and heat the surface of the compound with the mouth blowpipe,

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temper, place in the mouth, and have the patient seat and hold the denture under biting pressure, until the impression is chilled. Prepare and adapt the section across the rear of the denture. Lastly, prepare and adapt the labial section. The technic for flasking and packing is identical with that employed for rebasing the lower denture.

Remounting Dentures in the Articulator. Take a horseshoe plate, and remove the pins that project from the under surface of it. Attach a small roll of soft compound to the upper surface of the horseshoe plate, press the teeth of the upper denture into the compound, and chill until hard.

Make marks on the right and left cheeks to locate the condyle regions. Place the dentures in the mouth. Attach a roll of soft compound to the under side of the horseshoe plate. Seat the prepared upper surface of the horseshoe plate against the upper teeth and hold in this position while the patient closes the teeth of the lower denture into the soft compound on the under side of the plate. When the compound is set, adjust the face bow, and remove.

Place small masses of soft wax on the occlusal surfaces of the right and left lower second bicuspids and first molars, place the lower denture in the mouth, and have the patient close the mandible in central occlusion, or correct bite relation. When the bite is registered correctly in the wax pieces, remove both upper and lower dentures.

Seat the upper denture in the imprints made in the compound on the upper side of the horseshoe plate. Attach the horseshoe plate to the slipjoint stem of the face bow and adjust the face bow to the articulator. Fasten the upper denture to the upper articulator bow with plaster. When the plaster is set, remove the face bow and horseshoe plate and place the lower denture in the relation to the upper,

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indicated by the wax on the bicuspids and molars. Turn the articulator upside down and attach the lower denture to the lower bow of the articulator, with plaster. The cases are now ready for regrinding.

Remove. The act of taking an impression out of the mouth, accomplished without the application of force, in order to avoid bending partly hardened parts of it out of shape. To release the impression for removing, insert the finger tip between the cheek and edge of the impression, so as to displace the soft valve tissue and allow air to pass under the impression.

If the impression cannot be released in the manner just described, instruct the patient to hold the lips in contact and force air into the oral cavity until the cheeks puff out, when the impression will be released; or raise the lip and place the outlet of a compressed air syringe at the frenum notch of the impression, then release a short puff of air. This will cause the impression to drop.

Rest Bite or Central Occlusion. See Articulation.

Retrusive Lower Ridge. See Classification by Ridge Relation.

Seat the Impression. A term used to indicate the operation of carefully introducing the impression into the mouth and placing it in position on the ridge.

When a flange has been heated, the softer side should enter the mouth last. A cold impression may be seated with pressure on both ridges simultaneously. A lower impression, which has been heated locally for correction, should be seated with the heaviest pressure applied to the unheated side. For the upper, the pressure should usually be made on the stop rivet in the center of the impression, or between the ridge of the cold side and the rivet.

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Sectional Rebasing Technic, Lower. This method consists in preparing, and adapting to the ridge with compound, a section of the denture embracing about one-fourth of the area that fits the ridge. When the first fourth of the denture base is refitted a second fourth is prepared and fitted, and so on until the entire area is rebased. The advantages of this technic are that the bite relation may be kept correct for difficult cases, and that it is easier to apply to such cases as present thin high ridges.

Remove the upper denture from the mouth. Trim the left lingual flange of the lower denture with a vulcanite bur, so that it presents a smooth inclined drawing surface. Trim from the median line to the heel, and from the crest of the ridge to the lower edge of the flange. The rubber must be cut away to a depth of 1 mm. at least, throughout the area trimmed.

Trace a quantity of compound along the middle of the trimmed zone (midway between the edge of the flange and the crest of the ridge). Temper, and quickly seat the impression on the ridge, applying pressure mostly on the unaltered right side. Without waiting for the compound to set, remove and chill the impression. If compound has been forced out of the trimmed zone and overlaps an unprepared surface, cut through the overlapping compound with a sharp knife and remove.

With a blowpipe, glaze the surface of the half of the compound addition that is situated nearest the crest of the ridge. The half of the addition near the margin of the flange should be only slightly heated. Temper and seat the impression on the ridge, with pressure applied mainly to the right side of the denture. Chill in position and remove. The foregoing technic, calling for the employment of finger pressure in seating the denture, is based on the assumption that the biting pressure was evenly distributed on the dentures when rebasing commenced. If

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it was not, the right and left buccal flanges may be prepared and adapted at the same time under biting pressure, instead of by finger pressure. The even distribution of biting pressure should be tested from time to time as rebasing proceeds, in any event.

Prepare and fit the right lingual flange, the left buccal flange, and then the right buccal flange.

s. Test for errors and correct the rebase impression, employing the same technic as for the full lower impression. Remove surplus compound that extends over onto the bucco-labial surfaces of the impression. Fill up small inaccuracies with black carding wax.

Set-up Rim. A horseshoe-shaped rim of compound shaped over the lower cast, the upper surface of which is flattened against the under surface of the upper bite rim, to the plane of occlusion, with the incisor guide pin of the articulator set for the correct bite opening. On the occlusal surface of the rim two series of marks are made as a guide for setting the upper posterior teeth of the right and left sides above the middle of the lower ridge, so that the lower posterior teeth will be so placed when articulated.

Stay Put Stage. See Compound—Working Stages.

Stop Rivet. A rivet shaped piece of Trubase or base plate material attached to the center of the upper impression tray. One end of the rivet is expanded on the under side of the impression tray, and the other end on the palatal surface.

Suction Trim. The act of trimming or moulding the softened margin of an impression by creating a partial vacuum in the oral cavity. The vacuum is formed by withdrawing the air from the mouth, past the base of the tongue until the tongue tissues and the bucco-labial muscles are adapted tightly to the material included in

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the mouth. The pressure so created forces the compound into vacant spaces along the ridge and conforms it to the irregularities of the peripheral soft tissues. To be effective, this method requires a surplus of material. It is impossible to properly trim the margins of a flange unless an excess of material is used. The impression must be supported by mandibular pressure, during trimming.

Temper. The act of immersing the glazed or flame-heated surface of an impression, to a slight distance, in warm water. This reduces the surface temperature of the material sufficiently to prevent burning the mouth. The impression must not be held in the water unless it is intended to further soften the compound under the glazed surfaces. The action of removing the impression should commence as soon as it is immersed to sufficiently wet the glazed surface.

Trace On. Building up a flange, or margin of an impression, with a softened tracing stick, to give it correct extension, or to correct local imperfections.

Tracing Stick Mouth Blowpipe Technic. A phrase employed to designate the sequence of steps followed in correcting a local error in an impression by adding material from a tracing stick, and the subsequent smoothing of the addition and elimination of surplus material and slight shoulders.

This technic is divided into two phases: the first in which the compound is added to the impression and approximately adapted to the ridge; the second, in which the addition is adjusted to fit the ridge with the same bearing pressure as the unheated portions of the impression.

Procedure: Heat the end of a tracing stick, by passing it slowly back and forth through the gas flame, pausing each time the stick is drawn out of the flame, to allow the heat on the surface of the stick to penetrate inward.

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As the heated area of the stick begins to flow and bend, carry the heated portion to the impression and deposit a cylindrical tracing of soft compound where it is needed. The speed with which the stick travels while the tracing is being deposited will determine the diameter of the tracing at a given consistency of material.

When the tracing is in place, temper and seat the impression on the ridge (making pressure on the unheated side) and without waiting for the addition to chill, remove the impression and chill it in cold water. If surplus material has been displaced onto an area that was not defective, make an incision through the surplus and chip it out of the impression. (This usually applies to surplus material that flows onto the seat for the crest of the ridge.) Glaze the addition and adjacent old material, temper, seat the impression on the ridge, and chill it in position.

In glazing, a triple folded gauze napkin chilled in ice-water, may be applied over any surface it is desired to protect from reflected heat, or a deflected flame.

If the defective area is on the edge or just inside of the margin of an impression, the compound should be added well inside of the defect from which position it will flow into the defect and fill it.

To correct poor adaptation of a lower impression flange, the compound should be added lengthwise of the flange, and halfway between the edge of the flange and the imprint of the crest of the ridge.

If the error is in the bottom of a ridge depression, add the tracing directly in the defective area.

NOTE: Practice softening the tracing stick and forming ropes on a glass slab, instead of on an impression.

Withdraw the Air. See Exhaust the Air.

Working Bite. See Articulation.

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TRUBYTE DIMENSION CHART

UPPER MOULDS

		Mould No.	Length Central Without Collar	Width 6 Anteriors Set up	Width Full 14 Set up	Combined Bite and Shut of Central	Width of Central
SQUARE TYPE	CLASS I. Form 1	1C	9.5	42.	100.	8.	6.75
		1D	10.5	46.	108.	8.	7.25
		1E	11.	48.	113.	9.	7.75
		1F	11.25	52.	117.	9.5	8.
		1H	12.25	57.	120.	9.5	8.5
	Form 2	2C	9.25	46.	108.	8.	7.25
		2D	9.75	49.	111.	8.5	7.75
		2E	10.5	50.	115.	9.5	8.
		2F	11.25	52.	127.	9.5	8.25
	Form 3	3B	8.	45.	107.	7.5	7.25
		3C	8.75	49.	111.	8.	7.75
		3D	9.5	48.	113.	8.	8.8
	Form 4	4B	8.5	47.	113.	6.5	7.5
		4C	9.25	49.	117.	7.	8.
		4E	10.	50.	118.	7.	8.25
		4H	10.25	52.	120.	7.	8.5
	Form 5	5C	9.	34.	96.	8.	6.5
		5D	9.5	37.	101.	8.	7.
		5E	10.	39.	106.	8.5	7.25
		5F	11.	48.	110.	9.	7.75
		5H	11.5	52.	117.	9.	8.5
TAPERING TYPE	CLASS II. Form 1	1M	9.	45.	107.	8.5	7.5
		1N	9.75	48.	110.	9.5	8.25
		1P	10.5	52.	117.	9.5	8.5
		1R	11.	54.	125.	9.5	8.75
	Form 2	2M	9.5	45.	107.	8.5	7.
		2N	10.	46.	108.	8.5	7.5
		2P	10.75	51.	116.	9.	8.
	Form 3	3M	9.5	45.	103.	8.5	7.
		3N	10.25	48.	110.	8.5	8.
		3P	11.	54.	125.	8.5	8.5
	Form 4	4M	9.5	44.	102.	8.5	7.25
		4N	10.5	49.	111.	9.	7.75
		4P	10.75	52.	114.	9.	8.25
	Form 5	5M	9.	45.	103.	7.5	7.25
		5N	9.5	46.	108.	7.	7.5
		5P	10.25	49.	111.	8.	8.
		5R	11.	53.	118.	8.5	8.75
OVOID TYPE	CLASS III. Form 1	1W	9.75	46.	108.	8.	7.5
		1X	10.25	48.	110.	8.	8.
		1Y	11.	52.	117.	8.	8.5
	Form 2	2U	10.	42.	100.	7.5	7.
		2X	10.25	46.	111.	8.	7.75
		2Y	10.5	48.	113.	8.	8.
	Form 3	3U	9.25	48.	110.	8.	7.5
		3W	10.	50.	115.	9.	8.
		3X	10.5	54.	119.	8.5	8.5
		3Y	11.	55.	120.	9.	9.
	Form 4	4U	9.25	46.	104.	8.	7.25
		4W	9.75	48.	110.	8.	7.75
		4X	10.5	50.	112.	8.	7.75
		4Y	11.	52.	117.	9.	8.5

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TRUBYTE DIMENSION CHART

LOWER MOULDS

		Mould No.	Length Central Without Collar	Width 6 Anteriors Set up	Width Full 14 Set up	Combined Bite and Shut of Central	Width of Lower Incisors Carded
SQUARE TYPE	CLASS I. Form 1	1C	7.5	31.	95.	7.5	18.5
		1D	9.	35.	104.	9.	19.5
		1E	9 5	38.	108.	9.5	22.
		1F	9 5	39.	109.	9.	21.5
		1H	11.	49.	125.	9.75	24.5
	Form 2	2C	8.5	35.	104.	8.	19.5
		2D	9.	36.	105.	8.5	20.
		2E	9.75	38.	108.	9.	21.5
		2F	10.5	40.	110.	10.	22.5
	Form 3	3B	7.	34.	103.	7.5	19.5
		3C	8.	37.	106.	8.	21.5
		3D	8.5	39.	109.	8.	22.
	Form 4	4B	7.	36.	109.	6.	22.
		4C	8.	37.	111.	6.5	23.
		4E	8.	37.	110.	7.	22.
		4H	9.	40.	115.	7.	25.
	Form 5	5C	8.5	30.	94.	8.5	17.
		5D	8.5	33.	97.	8.	18.
		5E	8.5	34.	103.	8.5	19.
		5F	9.	35.	104.	8 5	19.
		5H	10.	42.	112.	8.	22.
TAPERING TYPE	CLASS II. Form 1	1M	8.5	35.	104.	8.	19.
		1N	9.	38.	107.	8.5	21.5
		1P	10.	41.	111.	8.5	22.5
		1R	10.	42.5	128.5	9.5	23.
	Form 2	2M	8.	33.5	102.5	8.	19.
		2N	9.	36.	105.	9.	21.
		2P	10.	39.	109.	9.5	21.5
	Form 3	3M	8.5	34.	98.	7.5	19.
		3N	9.5	38.	107.	8.	21.
		3P	10.	42.	128.	7.5	23.
	Form 4	4M	8.5	33 5	97.5	8.	19.
		4N	9.5	37.	106.	9.	20.
		4P	10.	39.	108.	9.5	22.25
	Form 5	5M	7.5	34.	98.	7.	19.
		5N	8.	35.	104.	7.25	20.
		5P	8.5	38.	107.	8.5	21.5
		5R	9.	39.	109.	8.5	22.5
OVOID TYPE	CLASS III. Form 1	1W	8.5	34.	103.	7.	18.75
		1X	9.	36.	105.	8.	20.5
		1Y	8.75	38.	108.	8.	22.
	Form 2	2U	8 25	32.	96.	7.5	17.5
		2X	9.50	35.	104.	8.	20.
		2Y	9.25	35.	105.	7.75	19.5
	Form 3	3U	8.	35.	104.	8.	19.75
		3W	8.5	39.	109.	8.	21.
		3X	9.5	42.	112.	9.	23.
		3Y	10.	42.	114.	9.5	23.
	Form 4	4U	8.	35.	99.	7.5	19.
		4W	8.5	37.	106.	8.5	20.
		4X	9.5	39.	108.	8.5	21.5
		4Y	9.5	39.	109.	9.	22.25

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TRUBYTE ARTICULATION CHART

Upper and Lower Sixes with Molar and Bicuspid Carding

Mould No. Upper 6 Anteriors	Mould No. Bicuspid and Molars	Mould No. Lower 6 Anteriors	Moulds of lower sixes listed in this column are of the same width if listed on the same line. Moulds of the same width may be substituted for one another.
mm		mm	
1 C 42	28M	1 C 31	
1 D 46	30L	1 D 35	$2X^{9.5}, 2Y^{9.25}, 5F^{9.}, 2C^{8.5}, 1M^{8.5}, 5N^{8.}, 3U^{8.}, 4U^{8.}$
1 E 48	32L	1 E 38	$2E^{9.75}, 3N^{9.5}, 1N^{9.}, 1Y^{8.75}, 5P^{8.5}.$
1 F 52	32L	1 F 39	$2P^{10.}, 4P^{10.}, 4X^{9.5}, 4Y^{9.5}, 5R^{9.}, 3D^{8.5}, 3W^{8.5}.$
1 H 57	34L	1 H 49	
2 C 46	30M	2 C 35	$2X^{9.5}, 2Y^{9.25}, 1D^{9.}, 5F^{9.}, 1M^{8.5}, 5N^{8.}, 3U^{8.}, 4U^{8.}$
2 D 49	30M	2 D 36	$2N^{9.}, 1X^{9.}, 4B^{7.}.$
2 E 50	32M	2 E 38	$1E^{9.5}, 3N^{9.5}, 1N^{9.}, 1Y^{8.75}, 5P^{8.5}.$
2 F 52	32L	2 F 40	$4H^{9.}.$
3 B 45	30S	3 B 34	$5E^{8.5}, 3M^{8.5}, 1W^{8.5}, 5M^{7.5}.$
3 C 49	30S	3 C 37	$4N^{9.5}, 4W^{8.5}, 4C^{8.}, 4E^{8.}.$
3 D 48	32M	3 D 39	$2P^{10.}, 4P^{10.}, 1F^{9.5}, 4X^{9.5}, 4Y^{9.5}, 5R^{9.}, 3W^{8.5}.$
4 B 47	30M	4 B 36	$2D^{9.}, 2N^{9.}, 1X^{9.}.$
4 C 49	32M	4 C 37	$4N^{9.5}, 4W^{8.5}, 3C^{8.}, 4E^{8.}.$
4 E 50	32L	4 E 37	$4N^{9.5}, 4W^{8.5}, 3C^{8.}, 4C^{8.}.$
4 H 52	32L	4 H 40	$2F^{10.5}.$
5 C 34	28M	5 C 30	
5 D 37	28L	5 D 33	
5 E 39	30L	5 E 34	$3M^{8.5}, 1W^{8.5}, 5M^{7.5}, 3B^{7.}.$
5 F 48	30L	5 F 35	$2X^{9.5}, 2Y^{9.25}, 1D^{9.}, 2C^{8.5}, 1M^{8.5}, 5N^{8.}, 3U^{8.}, 4U^{8.}$
5 H 52	32L	5 H 42	$3P^{10.}, 3Y^{10.}, 3X^{9.5}.$
1M 45	30M	1M 35	$2X^{9.5}, 2Y^{9.25}, 1D^{9.}, 5F^{9.}, 2C^{8.5}, 5N^{8.}, 3U^{8.}, 4U^{8.}$
1 N 48	30L	1 N 38	$2E^{9.75}, 1E^{9.5}, 3N^{9.5}, 1Y^{8.75}, 5P^{8.5}.$
1 P 52	32L	1 P 41	
1 R 54	34M	1 R 42.5	
2M 45	30L	2M 33.5	$4M^{8.5}.$

The small figures after the mould numbers in Column I indicate the width of the 6 anterior upper teeth of these moulds set up. The corresponding figures in Column III indicate the width of

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TRUBYTE ARTICULATION CHART

Upper and Lower Sixes with Molar and Bicuspid Carding

Continued

Mould No. Upper 6 Anteriors	Mould No. Bicuspid and Molars	Mould No. Lower 6 Anteriors	Moulds of lower sixes listed in this column are of the same width if listed on the same line. Moulds of the same width may be substituted one for another.
mm		mm	
2 N 46	30L	2 N 36	2D9., 1X9., 4B7..
2 P 51	32L	2 P 39	4P10., 1F9.5, 4X9.5, 4Y9.5, 5R9., 3D8.5, 3W8.5.
3M 45	28L	3M 34	5E8.5, 1W8.5, 5M7.5, 3B7..
3 N 48	30L	3 N 38	2E9.75, 1E9.5, 1N9., 1Y8.75, 5P8.5.
3 P 54	34M	3 P 42	5H10., 3Y10., 3X9.5.
4M 44	28L	4M 33.5	2M8..
4 N 49	30L	4 N 37	4W8.5, 3C8., 4C8., 4E8..
4 P 52	30L	4 P 39	2P10., 1F9.5, 4X9.5, 4Y9.5, 5R9., 3D8.5, 3W8.5.
5M 45	28M	5M 34	5E8.5, 3M8.5, 1W8.5, 3B7..
5 N 46	30L	5 N 35	2X9.5, 2Y9.25, 1D9., 5F9., 2C8.5, 1M8.5, 3U8., 4U8..
5 P 49	30L	5 P 38	2E9.75, 1E9.5, 3N9.5, 1N9., 1Y8.75.
5 R 53	32L	5 R 39	2P10., 4P10., 1F9.5, 4X9.5, 4Y9.5, 3D8.5, 3W8.5.
1W 46	30L	1W 34	5E8.5, 3M8.5, 5M7.5, 3B7..
1 X 48	30L	1 X 36	2D9., 2N9., 4B7..
1 Y 52	32L	1 Y 38	2E9.75, 1E9.5, 3N9.5, 1N9., 5P8.5.
2 U 42	28L	2 U 32	
2 X 46	32M	2 X 35	2Y9.25, 1D9., 5F9., 2C8.5, 1M8.5, 5N8., 3U8., 4U8..
2 Y 48	32L	2 Y 35	2X9.5, 1D9., 5F9., 2C8.5, 1M8.5, 5N8., 3U8., 4U8..
3 U 48	30L	3 U 35	2X9.5, 2Y9.25, 1D9., 5F9., 2C8.5, 1M8.5, 5N8., 4U8..
3W 50	32M	3W 39	2P10., 4P10., 1F9.5, 4X9.5, 4Y9.5, 5R9., 3D8.5.
3 X 54	32L	3 X 42	5H10., 3P10., 3Y10..
3 Y 55	32L	3 Y 42	5H10., 3P10., 3X9.5.
4 U 46	28L	4 U 35	2X9.5, 2Y9.25, 1D9., 5F9., 2C8.5, 1M8.5, 5N8., 3U8..
4W 48	30L	4W 37	4N9.5, 3C8., 4C8., 4E8..
4 X 50	30L	4 X 39	2P10., 4P10., 1F9.5, 4Y9.5, 5R9., 3D8.5, 3W8.5.
4 Y 52	32L	4 Y 39	2P10., 4P10., 1F9.5, 4X9.5, 5R9., 3D8.5, 3W8.5

the anterior lower 6 teeth set up. The small figures after the mould numbers in Column IV indicate the length of the lower central incisors of the mould.

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Condensed List of Steps in Impression, Bite Taking, and Selection Technic

1. Thoroughly Examine the Oral Cavity.
2. Make Upper and Lower Snap Impressions.
3. Trim Surplus from Snap Impressions.
4. Make Upper and Lower Study Casts.
5. Select, Trim and Shape the Upper Tray.
6. Attach a "Stop Rivet" to the Tray.
7. Build a Bite Rim on the Upper Tray.
8. Draw a Line on the Face to Show the Inclination for the Plane of Occlusion.
9. Determine Size of the "Impression Mass."
10. Place the Compound on the Tray and Prepare It for Taking the Impression.
11. Make the Upper Base Impression.
12. Trim Surplus from Upper Base Impression.
13. Build Up Defective Margins, If Indicated.
14. Trim Upper Bite Rim to the Occlusal Plane.
15. Cut Guide Notches in Upper Bite Rim.
16. Shape the Lower Tray.
17. Guide Rim the Lower Tray.
18. Make the Lower Bite Support.
19. "Suction Trim" the Flanges of the Upper.
20. "Muscle Trim" the Upper Buccal Flanges.
21. Inspect the Flanges for Errors.
22. Transfer, to the Impression, Outlines of Areas to be Relieved and Compressed.
23. Post Dam the Upper Impression.
24. Test the Impression for Retention.
25. Instruct the Patient How to Assist in Taking the Lower Impression.

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26. Prepare the Lower Impression Mass.
27. Make the Lower Impression.
28. Trim the Lower Base Impression to Preliminary Outline Form.
29. Correct Errors that Defeat "Suction."
30. Finish Trimming the Lower Impression.
31. Break the Heels Off the Lower Impression.
32. Center the Lower Bite Rim Over the Ridge.
33. Establish a Height for the Lower Bite Rim.
34. Provide an Interocclusal Space of Three to Six Millimeters Between the Bite Rims.
35. Modify the Shape of the Upper Bite Rim to Give Pleasing Form to the Upper Lip.
36. Mark the Median Line and Cuspid Lines.
37. Record the Width for the Six Front Teeth.
38. Select a Form of Tooth That Will Harmonize with the Patient's Face.
39. Select the Shade.
40. Attach the Horseshoe Plate to the Occlusal of the Lower Bite Rim.
41. Attach the Incisor Path Marker.
42. Blacken the Front of the Horseshoe Plate.
43. Record the Incisor Path.
44. Make a Cross Mark on Each Cheek to Locate the Condyle Positions.
45. Adjust the Face Bow to the Width of Face.
46. Lock Face Bow When In Correct Position.
47. Cut Lock Notches in Both Bite Rims.
48. Relieve the Impression.
49. Box the Impressions for Casting.
50. Make the Casts.

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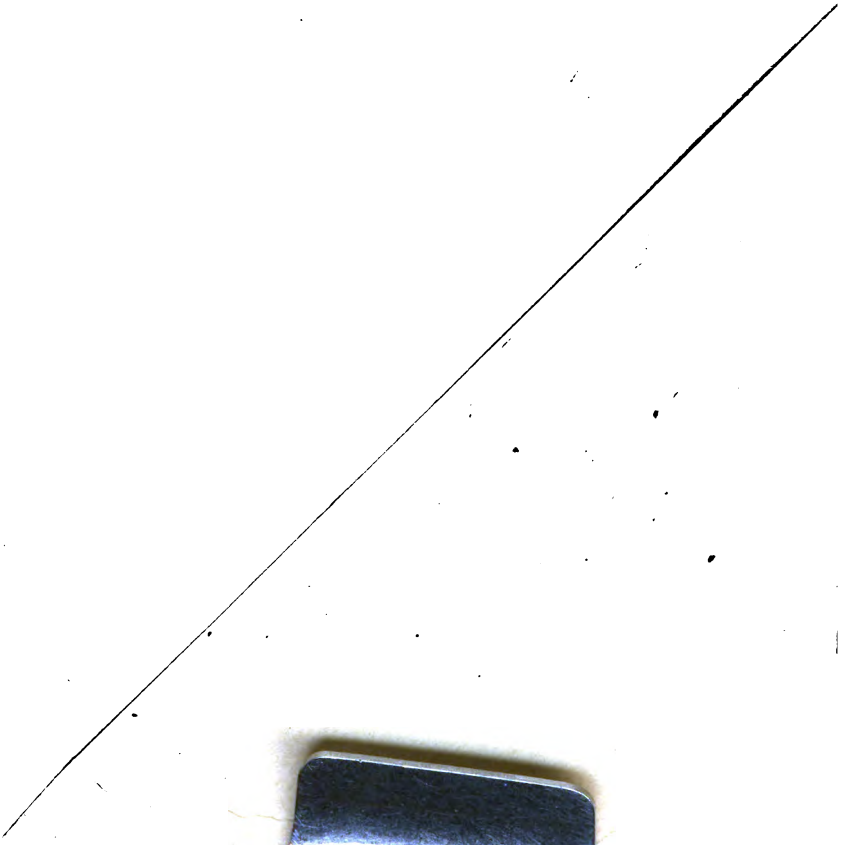

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